

# Desert Birding in Arizona



## With a Focus on Urban Birds

By Doris Evans

Illustrations by Doris Evans and Kim Duffek

**A Curriculum Guide for Elementary Grades  
Tucson Audubon Society  
Urban Biology Program**

Funded by:  
Arizona Game & Fish Department Heritage Fund Grant  
Tucson Water  
Tucson Audubon Society



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**Heritage Fund**  
Lottery dollars at work



**Tucson Audubon Society  
Urban Biology Education Program**

**Urban Birding is the third of several projected curriculum guides in Tucson Audubon Society's Urban Biology Education Program. The goal of the program is to provide educators with information and curriculum tools for teaching biological and ecological concepts to their students through the studies of the wildlife that share their urban neighborhoods and schoolyards.**

**This project was funded by an  
Arizona Game and Fish Department Heritage Fund Grant,  
Tucson Water, and Tucson Audubon Society.**

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Kits containing the materials for activities in Lessons One, Two, Three, and Ten may be checked out at Tucson Audubon Society.



## ACKNOWLEDGEMENTS



Many people took time from their busy schedules to assist me with information, suggestions, corrections, and editing. I wish to extend my sincere appreciation and thanks to the following people for their invaluable contributions.

The publication of this book was made possible through the Arizona Game & Fish Heritage Grants Program and a joint commitment of Tucson Water and Tucson Audubon Society. Cate Bradley, former Tucson Water Wetlands Interpretive Coordinator, coordinated the fiscal agreement. Erin Deely from the Tucson Audubon Society developed the grant proposal and lent her support and encouragement throughout the production of the project.

Twenty-five Tucson Unified School District teachers attended an Urban Birding professional development workshop and participated in some of the lessons. I appreciate their advice and support. In addition, I wish to thank Kathy Lloyd, Susan Thompson, Kristen Bates-Scott, Glenna Coleman, and Karen Peppard for piloting lessons and activity kits in their classrooms. Janice Dungan provided many excellent ideas on formulating the lessons.

Before the final work, a manuscript passes through the hands of many experts for their edits, comments, criticisms, and corrections on content, layout, grammar, and spelling. I am indebted to the following people for their contributions— Erin Deely, Mason Audubon Center Director; Judy Edison, Tucson Audubon Society Nature Shop Manager; Suzanne Dhruv, TAS Education Director; Kevin Dahl, former Executive Director of Tucson Audubon Society. Wendy Burroughs, Environmental Education Specialist and Wildlife Ecologist shared her infinite knowledge of raptors and allowed me to use her raptor mobile idea.

I wish to thank the following Arizona Game and Fish Department members for their careful editing and invaluable suggestions. The Phoenix staff included Kerry Baldwin, Education Branch Chief; Karen Schedler, Environmental Education Program Manager; Cathryn Wise, Arizona Breeding Bird Atlas Specialist; and Sandy Reith, Project WILD Coordinator. In Tucson, Scott Richardson, Urban Wildlife Specialist, reviewed the manuscript, and shared the artwork of Kim Duffek, which was originally published in *Tucson Birdwatching Guide*—a cooperative effort between Arizona Game and Fish Department's Heritage Grant-In-Aid Program and Tucson Audubon Society.

Steve Phillips, Publications Manager of the Arizona-Sonora Desert Museum gave permission to reproduce the English – Spanish bird list, which appears in from *Desert Life, A Vocabulary/Vida Desértica, Vocabulario* by Doris Evans and Jesús García.

I also wish to thank Carrie Dean, Environmental Education Specialist at T.U.S.D.'s Cooper Environmental Science Campus, for her invaluable assistance with the Urban Birding workshop, her excellent contributions of lesson ideas, and for sharing her many resource materials with me.

A special thanks goes to my husband, Doug Evans, for editorial and research assistance, for accompanying me on the trails, and assisting me in so many ways throughout the evolution of this project.

I dedicate this book in memory of my dear friend, Anne Bellamy, whose love of birds opened the world of birding to so many teachers, thus inspiring them to include this delightful subject into their classrooms and, in turn, inspiring me to pursue this project.



## PREFACE



The ideal way to learn biology is through the observation of living things. Educators need not despair because of lack of field trip money to travel to the many wonderful environmental education sites that require transportation. Wildlife is all around us—even though we may live miles from pristine desert. Plants and animals abound in the city. Some species are the same as those found in natural areas; others are immigrants that thrive in urban habitats.

With a multitude of living science subjects so close at hand yet so often unnoticed, Tucson Audubon Society decided to provide curriculums specific to southern Arizona that would assist teachers in taking advantage of the world of wildlife just beyond the school door. The first two Tucson Audubon Society Urban Biology curriculums are *Dr Strangeplant, An Upper Elementary Science Unit for Studying Urban Weeds*, by David W. Lazaroff and *Arthropodantics*, by Janet Bardwell, Doris Evans, and Robin Roche. The lessons and hands-on activities inspired many teachers to take their students to the school grounds and neighborhoods to learn about plants and arthropods—living organisms that can be observed and studied within walking distance of the classroom, and within the time constraints of a science class.

This third guide, *Desert Birding in Arizona~ With a Focus on Urban Birds*, again takes advantage of life found in urban as well as suburban and rural Arizona. Birds abound in our neighborhoods, schoolyards, and parks. The guide incorporates all aspects of the core curriculum—science, of course, but also social studies, language skills, mathematics, and the arts.

The number of children who are exposed to the natural world is diminishing. Because many have not become acquainted with the native life of our desert surroundings they have little understanding and some fear of it. Observing birds in the neighborhood provides children with an introduction to the environment. Curiosity is aroused and observation powers grow as students make discoveries about the lives of our urban birds and the habitats in which they live.

Teachers need not be concerned about their inability to identify birds or not knowing much about them. Some identification knowledge is helpful and the first lessons take teachers and students through basic identification skills. However, the primary goal of this curriculum is developing observation skills that then lead to recording information, communication with other students, noting similarities and differences, analyzing cause and effect—all part of the scientific process.

Another wonderful aspect of these lessons is that they easily transfer to the home and family. As students continue their observations with backyard birds, the rest of the family may become involved, and soon everyone is noticing the birds in the yard. Bird song, nesting activity, feeding activity, the comings and goings of different species, and other behaviors become a source of pleasure and interest to parents and children who may have never noticed the birds before.

As a teacher and as a teacher workshop instructor, I am continually delighted to watch the mounting enthusiasm of both children and adults as the world of birds is opened to them and they begin to really see all those fascinating feathered creatures that are so much a part of our environment.

Doris Evans, Tucson Arizona, 2001



## **Section One ~ An Introduction to the Lessons**












### **Why study birds?**

Birds are all around us, but many of us go about our daily routines unaware of their presence. The mockingbird singing from the top of a telephone pole, the house sparrow picking at crumbs beneath a picnic table, and the pigeons roosting on the ledge of a building are part of the urban setting. All we need to do is become aware of birds, and we do this by learning about them. Through observation and research we begin to see and hear the birds, learn to recognize them, observe their behaviors, and listen to their calls. Soon a fascinating world has opened up to us—the world of birds.

Many educators assume an extended field trip is necessary to study nature, but we do not have to journey to a natural history site such as Tucson's Arizona-Sonora Desert Museum, Sabino Canyon, and Saguaro National Park or Phoenix's Papago Park, Desert Botanical Garden, or distant parks to see birds. Of course, those are excellent places to watch wildlife, but schoolyards, backyards, city and county parks, and neighborhood streets are homes for birds, too. The availability of these living subjects is one of the factors that makes bird study relevant and interesting to students.

### **So—why study birds?**

- 🐦 Birds are everywhere and can be observed and studied in backyards and school grounds.
- 🐦 It gets us outdoors.
- 🐦 The equipment is inexpensive.
- 🐦 It is quiet, relaxing and easy.
- 🐦 It is something that can be done with family and friends.
- 🐦 A lifetime interest may be developed.
- 🐦 Birds can be observed the year around.
- 🐦 Bird watching exposes us to beauty in nature.
- 🐦 A bird walk is a healthy outdoor exercise activity.
- 🐦 Birds are interesting. It's fun to identify them and try to figure out what they are doing.

-  We can watch birds as we go about our daily routines—looking out the window, walking to school or to a friend’s house.
-  Observation skills are developed.
-  Interest in research is piqued, encouraging reading and writing.
-  A sense of the importance of birds and their role in the environment is developed.
-  Bird watching provides opportunities to experiment with feeding, housing, and habitats.
-  Environmental ethics are learned as observers watch birds without disturbing them or their habitats.
-  Bird study can be incorporated into all aspects of the curriculum.
-  Birds allow for opportunities to observe physical adaptations.
-  It makes one aware of the natural world around us.
-  As we begin looking for birds we may get to places we otherwise may not see.
-  Observing birds adds another dimension to our lives.

Are these enough reasons to study birds? Let’s get started! But first, we will review the contents and format of this book. It will help you plan your Birding Unit.

## **Overview**

### **Section One—Ten Lessons**

Ten lessons comprise Section One. Each lesson begins with **Background** information for the teacher, followed by a number of Activities. You may choose one or more activities depending upon time constraints and your grade level. Illustrations and charts needed for the activities are included in each lesson. **Taking Flight** provides ideas for additional research projects.

**Lessons One, Two, and Three** introduce children to birds—observation and identification techniques, use of binoculars, bird walk etiquette, and awareness of adaptations. These lessons should be conducted first.

**Lessons Four through Ten** stand alone. Each covers a separate aspect of bird study. Look over the lessons and determine which suit the interests and ability of your class.

### **Section Two—Research Ideas**

This section presents a variety of research activity ideas.

### **Section Three—Creative Projects**

Try some of these creative projects for the classroom.

### **Section Four—Appendix**

Where to take your class for a birding experience, local resources, setting up a school binocular kit, books for the classroom, and more are contained in this section.

### **Section Five—Southern Arizona Birding Guide**

Here is a mini-field guide you may reproduce for your students.



## ***Lesson One: What's That Bird?***

### **Introduction to Field Marks, Calls, Habitats and More**

#### **Background**

There are so many birds out there. How can we ever learn their names? One reassurance is that you don't have to identify every bird you see. Watching a bird's behavior, trying to figure out what it's doing, enjoying its song and its beauty is rewarding in itself. But we humans are name conscious and we like to put things into categories. Here are some exercises that will introduce children to the "game" of *Name That Bird*.

People who know birds are often frustrated when someone asks them to identify a bird he or she has seen because the conversation usually goes like this:

Friend: I am watching this interesting bird in my yard and would like to know what it is.

Birder: Describe it to me. How big is it?

Friend: Well, it's bird size.

Birder: What color is it?

Friend: Sorta brownish, no, maybe it was more yellow.

Birder: Does it have markings or colors on its wings, head, rump, breast?

Friend: Hmmm. I didn't notice.

Birder: What kind of bill does it have?

Friend: A bird bill.

Birder: Tell me about the tail. Is it long, short, rounded, pointed?

Friend: Just a regular tail I guess, I didn't really look at the tail.

Birder: What does it sound like?

Friend: Gee, I don't think I listened to it.

Birder: Where is the bird usually found...on the ground? in a tree? at a certain plant?

Friend: It's just in the yard.

Birder (trying not to look too frustrated): Why don't you write down what you notice next time you see the bird, then let's look at the bird book.

There are a number of ways to observe a bird. Initially the list below may seem daunting. But it's like learning to ride a bicycle. There seems to be too much to remember, but later all the parts come together and it's all so easy and natural.



A kit containing materials for Lesson One  
may be checked out at Tucson Audubon Society.

## Activity One – Introduction to Field Marks, Calls, and Habitat of Birds We Already Know Using Cartoon Birds

**Materials:** Dolls or pictures of some of these favorite cartoon characters: Donald Duck, Daisy Duck, Daffy Duck, Tweety Bird, Big Bird, Woodstock, Roadrunner, Woody Woodpecker. Pictures can be obtained from comic books, greeting cards, and coloring books. Dolls can be found at The Disney Store, Warner Brothers store, other toy stores, and thrift shops.

### Field Marks



**Focus:** Field marks are those unique spots, stripes, colors, and patterns that tell us which bird is which. Field marks also include size and shapes of various parts of a bird's anatomy.

#### Procedure:

Introduce the lesson by keying into students' prior knowledge of and experience with birds. Ask: "What do you know about birds? What birds can you recognize? How can you tell one bird from another?"

Continue by asking: "Did you know you can already identify some birds?"

Hold up Donald Duck and ask who it is. Of course everyone knows Donald.

Ask: "How did you know this is Donald Duck?" At first the children will respond, "Cause it looks like Donald Duck." Ask which features tell us it's a duck.

Students will answer: "duck bill", "webbed feet", "duck tail".

Now ask how they knew it was **Donald** and not another duck.

Students will respond with "blue sailor suit", "sailor hat", and other features. Tell the class that they have just named some *field marks*—those features that tell us this is a duck, specifically Donald and not some other kind of bird.

Now hold up Daffy Duck. Go through a similar questioning session. Students will notice that Daffy also has a duck bill, webbed feet and duck tail. But he is black and has a white ring around his neck.

So here we have two ducks. We could tell they are ducks because of the bill, feet, and shape. We knew they were different species of ducks because of the different color and markings.

Continue with other birds in your "aviary". As children get the idea they will give more details of each bird.



Boys and girls will identify:

Tweety Bird's big head, big eyes, and yellow body.

Roadrunner's crest, blue color, and long orange legs.

Big Bird's striped legs.

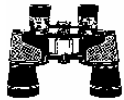
Woodstock's feathery crest and big "nose".

Woody Woodpecker's red crest and blue body.

Daisy Duck, compared with Donald, will illustrate differences between male and female characteristics of the same species.

Tell the students they have been observing **FIELD MARKS** and write the term on the chalkboard.

## Calls



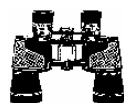
**Focus:** Besides markings and shape, the call or song of a bird is another clue.

### Procedure:

Ask if anyone can make Donald's "call". Chances are someone will be able to imitate Donald's quacky voice. Children are good at imitating Daffy's *thath's dithpicable*, roadrunner's "beep-beep", and Woody Woodpecker's *ha-ha-ha-HA-ha* call.

Explain that each of these birds has a special sound. One could identify the cartoon bird from its call without even seeing the bird. Write the term **CALLS** on the chalkboard

## Habitat and Environment



**Focus:** The habitat in which the bird is found is also a clue to identification.

Note—Where a species of plant or animal lives is its *habitat*. A habitat must include the essential needs of a living organism such as the water, food, shelter, space and the proper amounts of each. An *environment*, such as a city park, may include a number of habitats. See Page 9 for further explanation.

### Procedure:

Point to the following cartoon birds, which are depicted with definite habitats and ask students where they live:

Roadrunner lives in the desert.

Woodstock spends its time in a little nest or on top of Snoopy's doghouse.

Tweety Bird is usually in a bird cage.

Big Bird can be found on Sesame Street.

Explain that these are the habitats of these cartoon birds.

Write the term **HABITAT** on the chalkboard.



## Activity Two - Eight Ways to Observe a Bird

Now continue with real birds and learn about other things to observe. As you discuss the following Eight Ways to Observe a Bird, refer to observations the students made with the cartoon characters.

This is a good time for students to begin a Bird Study or *Ornithology* folder. You may duplicate the graphics at the end of this lesson. As the class discusses each of the observation techniques, they may add a graphic or pictures from magazines plus their notes. See **Activity Three** for ideas.

### 1. Size

**Materials:** Life size illustration of a Cactus Wren. (Illustration is at the end of the lesson.)



**Focus:** Birds come in many sizes, from the tiniest hummingbird to the huge ostrich. Using a common bird as a measuring “stick” helps us to remember and describe the size of a bird.

**Procedure:** Most children who live in the southwestern desert know the Cactus Wren. Post the life size picture and discuss the size of this bird. We can use this size to describe another bird we see. Is it larger than a cactus wren? twice as large? smaller? the same size?

### 2. Color and pattern

**Materials:** Large, colored pictures of birds. Look for samples in nature, travel, and photography magazines, calendars, and illustrated bird books for young children. See the Suggested Reading list in Section Four.



**Focus:** Colors, stripes, spots, wing bars, and eye rings are some of the field marks to note as one observes a bird.

**Procedure:**

Using the pictures, note distinguishing features. For example:

Note the colors on various parts of the bird.

Are there “bars” (stripes) on the wings?

Is the breast streaked or plain?

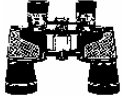
Is there an eye ring (white or other color ring around the eye)?

What are the tail markings—bands, spots?



### 3. Silhouette

**Materials:** Five silhouettes: Gambel's Quail, Mourning Dove, Gila Woodpecker, Northern Roadrunner, and Curve-billed Thrasher. (Illustrations are at the end of this lesson.)



**Focus:** Sometimes colors or patterns cannot be seen because the light is wrong. In that case the silhouette or the shape may help us identify the bird.

#### **Procedure:**

Post the silhouettes and ask the students to notice the differences. Examples:

The Gambel's Quail is fat, round, and has a topknot head feather.

The Mourning Dove has a small head and pointed tail.

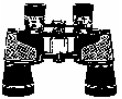
The Gila Woodpecker has a long, stout bill, and a short stubby tail which it props against a tree trunk.

The Roadrunner has long legs, a long tail, and a crest on its head.

The Curved-billed Thrasher has a long, curved bill, and a long tail.

### 4. Tails, feet, wings, and bills

**Materials:** Pictures of birds collected from magazines, or illustrations from books.



**Focus:** Other parts to observe are the bills, feet, wings, and tails. You might think that since all birds have these, they probably look the same. Not so! The shapes and sizes of these parts vary greatly from species to species.

#### **Procedure:**

Use the illustrations to show the different shapes. At this point in the lessons students need not identify which shape goes with which bird, but introducing children to these variations will make them aware of the differences. Later they will learn the importance of noting these aspects of bird anatomy when it comes to identification. In Lesson Three students learn how birds use these "tools" for survival.

### 5. Call or song

**Materials:** Recorded vocalizations from Peterson's *Western Birds* or other tapes or CD's. Good examples are the Cactus Wren, Screech Owl, and White-winged Dove. (Illustrations of these are at the end of this lesson.) Note: When you record the song, repeat it about three times so it will be long enough for the students to remember.



**Focus:** Calls of birds can remind us of the sounds of things or of words we use.

#### **Procedure:**

Listen to the Cactus Wren. Play the tape. Does it remind you of an old car trying to start?

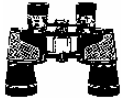


Listen to the White-winged Dove. Can you almost hear the words, “*Who cooks for you?*”? Listen to the Screech Owl. As the *hoo hoo hoo* speeds up and descends in pitch and volume, it sounds like a ball being dropped and allowed to bounce, with each bounce coming faster.

Listen to the calls of other common birds. The students may be able to come up with their own memory tricks for learning bird songs and calls. Look at the *Bird Talk Bulletin Board* idea in Section Three.

## 6. Flight pattern

**Materials:** Flight patterns of woodpecker, dove, and flycatcher. (Illustrations are at the end of this lesson.)



**Focus:** Different species of birds often have distinct flight patterns. Sometimes you can identify a bird, or at least the type of bird, by the way it flies through the air.

### Procedure:

Post the three graphics and study the different flight patterns of these birds:

Doves: Most doves have a strong, fast, straight-line flight.

Woodpecker: All species of woodpeckers have an undulating (up and down) pattern to their flight. A few fast wing beats cause the bird to fly upward, then as it folds its wings for a short time, it swoops downward.

Flycatchers: Most sit on a high, often bare, branch. From that perch they fly up into the air, catch an insect, and return to the same branch.

## 7. Perching posture

**Materials:** Pictures of various birds from magazines and illustrated books. Study birds with different postures, such as the dove, woodpecker, and hawk.



**Focus:** Just as different species of birds look different from one another in flight, they also differ in the way they perch or stand on the ground, a branch, or a telephone wire.

### Procedure:

Study pictures of perching birds and notice their posture.

Dove: Perches on a wire with body almost vertical with the ground. On the ground the body is horizontal to the ground.

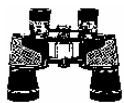
Woodpecker: Usually perches on the side of a post, tree trunk, or a saguaro. Head up, tail angled against the perch, acting as a prop.

Hawk: Usually stands vertically on the top of a pole, a saguaro, or high in tree branches.



## 8. Habitat and Environment: Where the bird lives

**Materials:** Pictures of environments: an urban setting, a natural desert area, and a wetland. (Illustrations are at the end of this lesson.) Pictures of birds that may be seen in these areas.



**Focus:** All living things, including birds, have certain needs, primarily food, water, space, and shelter. Not all birds need the same food and shelter, or the same amount of water. By knowing where different birds live, you will have an easier time identifying them. *An environment may contain a variety of habitats. As an example, in a city park some species of birds are usually feeding on the grass, others are in the trees or shrubs, while others are perched high in the trees. They seek out the proper habitat within their environment.*

### Procedure:

Explain that some birds stick strictly to certain habitats. Ducks, geese, and herons live where there is water. Rock Doves (pigeons), House (English) Sparrows, and European Starlings live near people. Roadrunners and Cactus Wrens are usually in the desert, though they may live in town if certain habitat needs are met.

Post the pictures of the three environments on the chalkboard or bulletin board. Write in the names of the birds, or place their pictures along with the appropriate habitat.

Examples:

City birds: House Sparrow, European Starling, Rock Dove (pigeon).

Desert birds: Cactus Wren, Curve-billed Thrasher, Roadrunner.

Water birds: Mallard, Great Blue Heron, Belted Kingfisher.

## Activity Three – Student-made Bird Study folders



**Focus:** A *Bird Study* or *Ornithology* folder is a handy way for students to compile, organize, and contain their notes, handouts, and other projects.

### Procedure:

Use 12 by 18 inch sheets of construction paper for the folder. Each student decorates a cover, prints the title and includes his/her name. For durability and an attractive appearance, laminate both sides of the paper. Throughout the Bird Unit students add their notes, your handouts, a bird glossary of terms, and any other pertinent materials. By the end of the unit students will have a valuable collection of information about birds—one they may wish to keep for a long time.

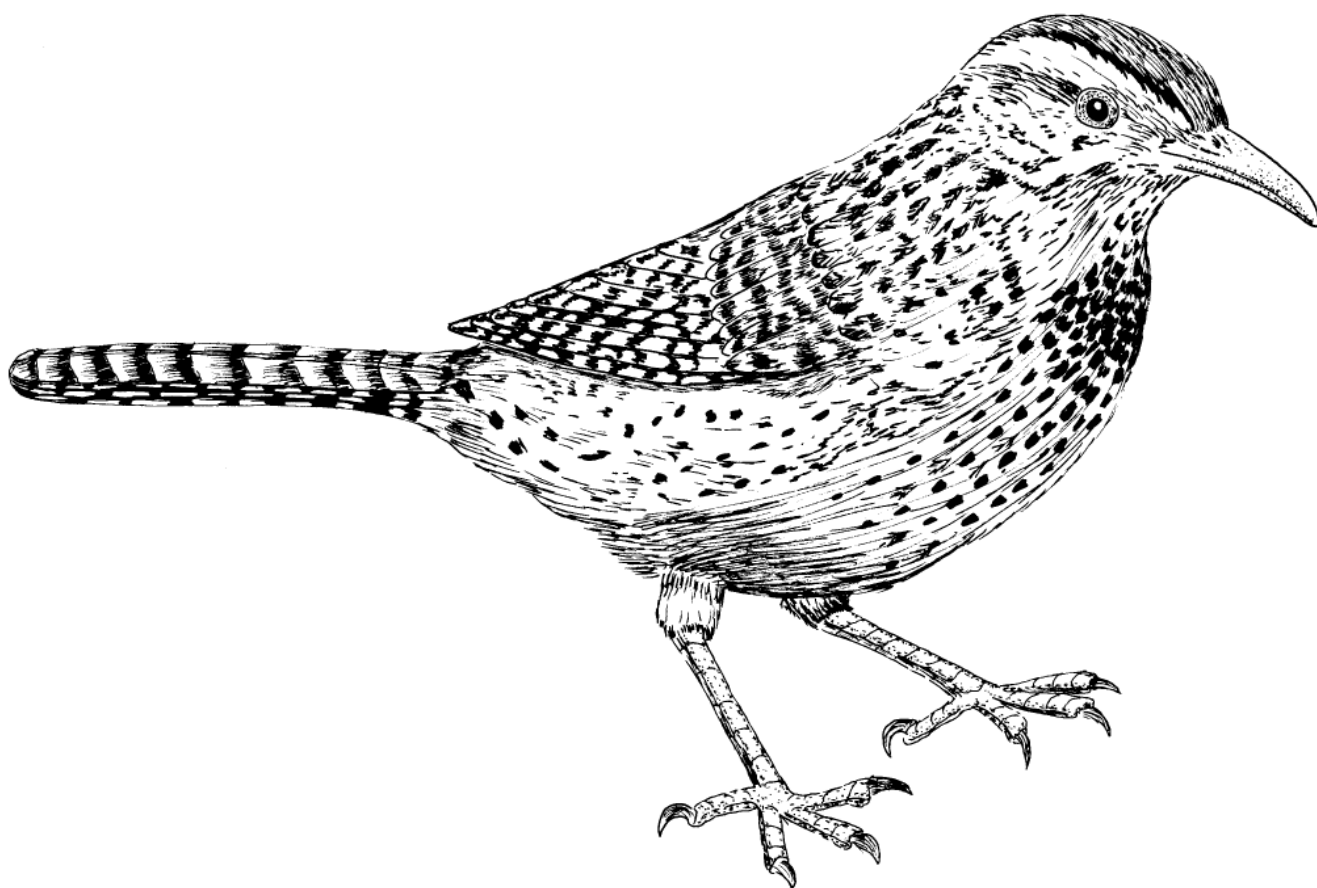
### Taking Flight

- Divide the class into teams. Each team chooses a bird species. Using “Eight Ways to Observe a Bird” each team describes its bird—color, markings, song, habitat, flight, silhouette, and other identifying features. Each team shares its findings and educates the other students on tips to identify the bird.
- Choose a few common birds of your area and learn the differences, if any, between male and female.



## Identify Birds by Size

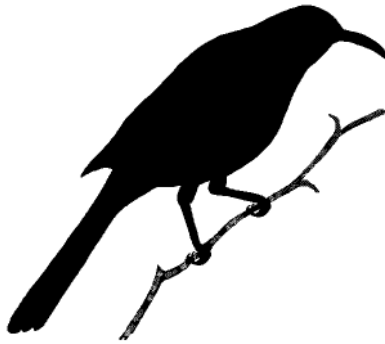
Use a bird you know to act as a ruler when you are trying to identify a new bird. As an example, here is a life size picture of a Cactus Wren, which is seven to eight inches long from the tip of the bill to the tip of the tail. While you are writing down field marks of an unknown bird, you can note the size as “bigger than a Cactus Wren”, “smaller than a Cactus Wren”, “twice as large as a Cactus Wren”, etc. If you are more familiar with another bird, use that bird as your measurement tool.



## Identify Birds by Shape



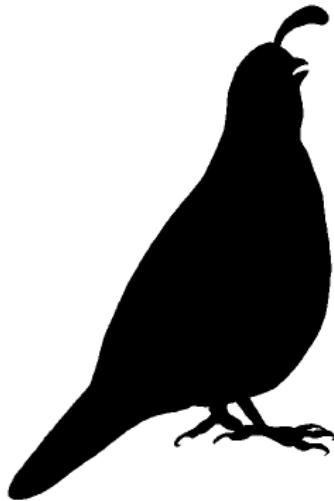
**Mourning Dove**



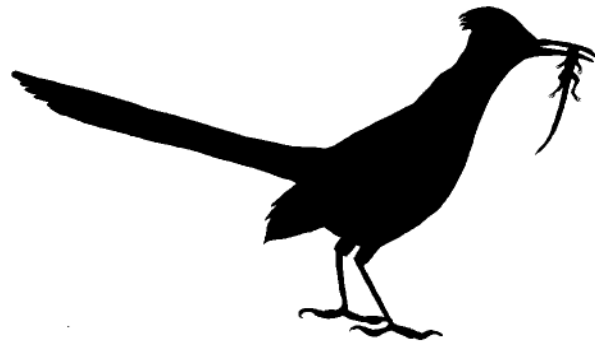
**Curve-billed Thrasher**



**Gila Woodpecker**



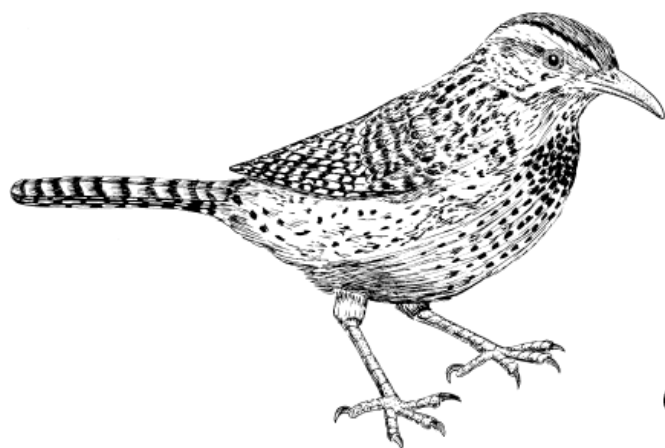
**Gambel's Quail**



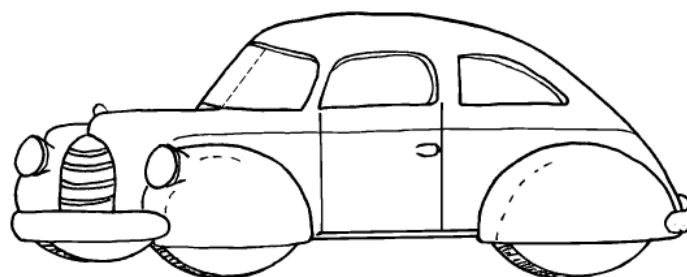
**Roadrunner**



## Identify Birds by Voice



**The Cactus Wren sounds like an old car trying to start on a cold morning.**



**cha cha cha cha cha**

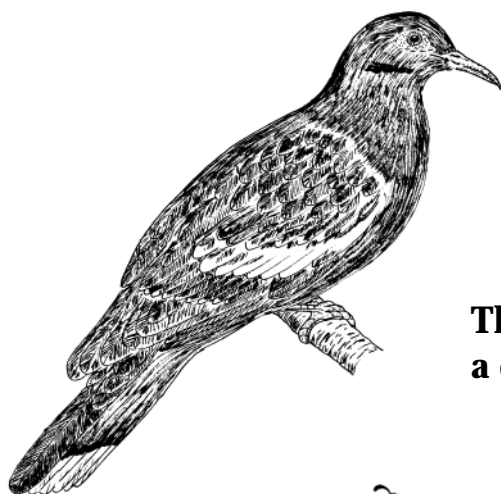
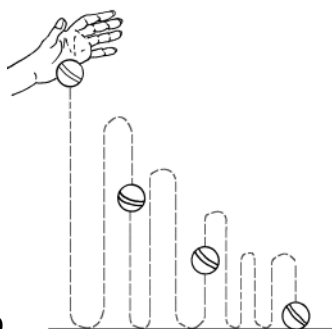
---

**The Screech Owl sounds like a ball being dropped and allowed to bounce.**

**hooo hooo**

**hooo hooo hooo**

**hoo hoo hoo hoo hoo hoo hoo hoo hoo hoo**



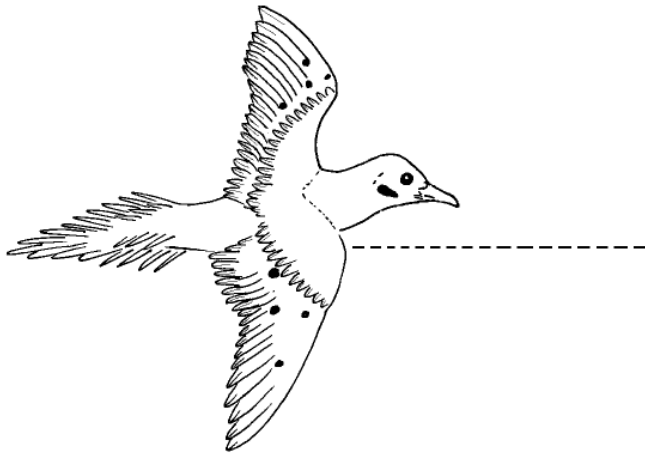
**Who cooks  
for you?**

**The White-winged Dove sounds as if it is asking a question.**

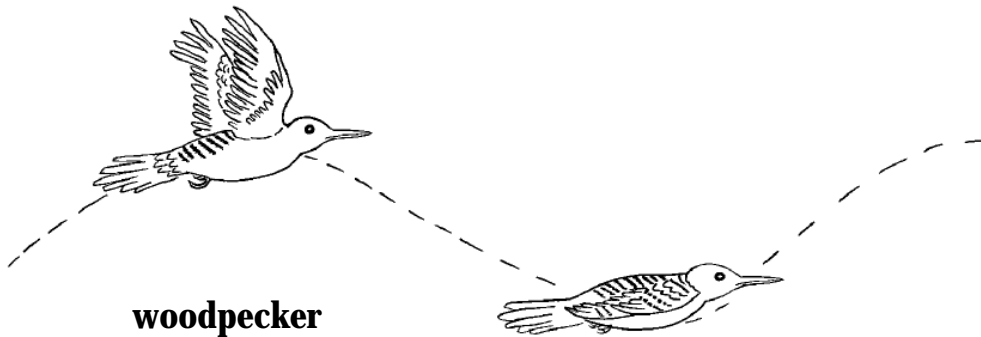


## Identify Birds by Flight Patterns

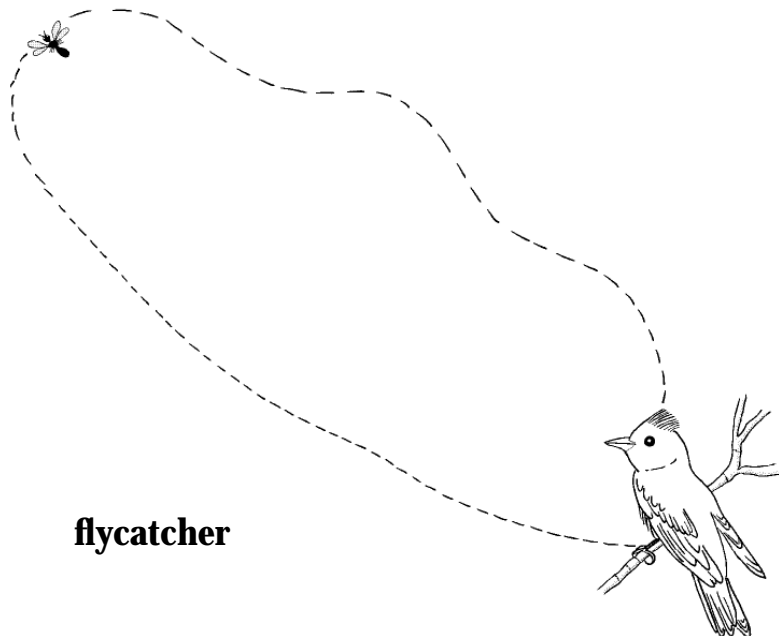
**dove**



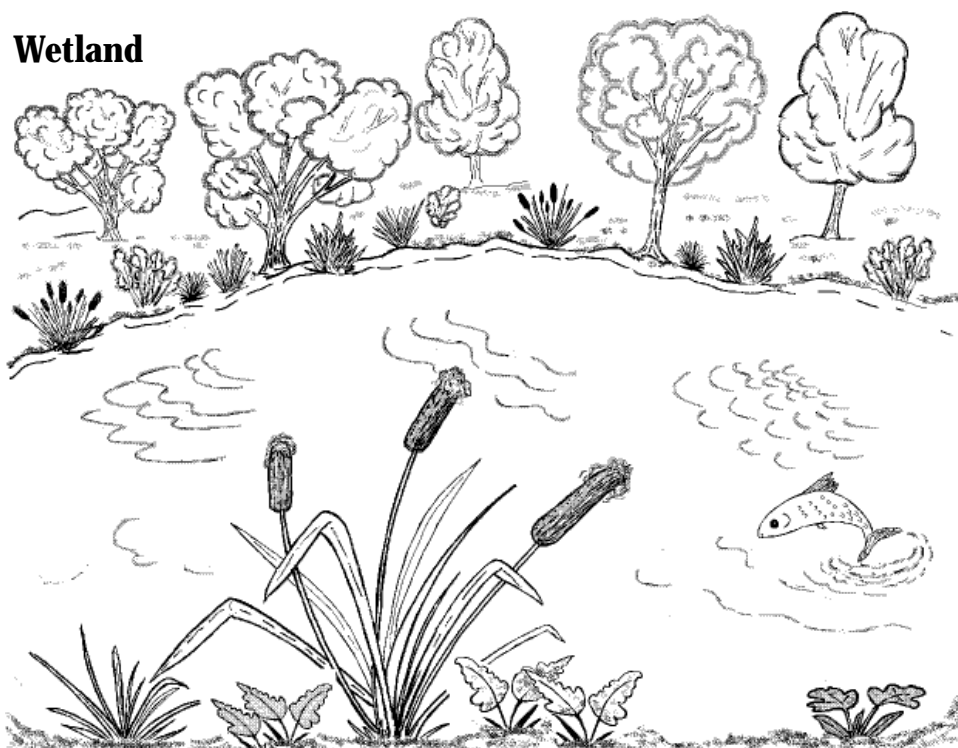
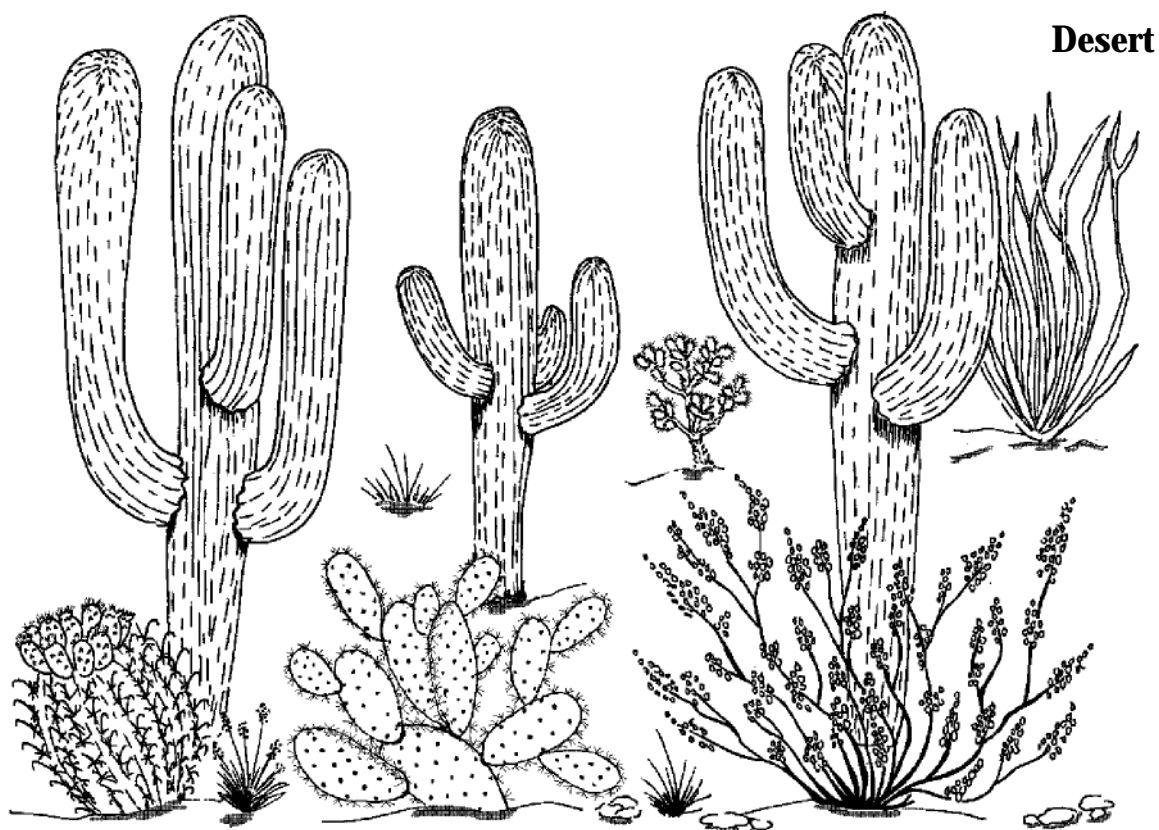
**woodpecker**



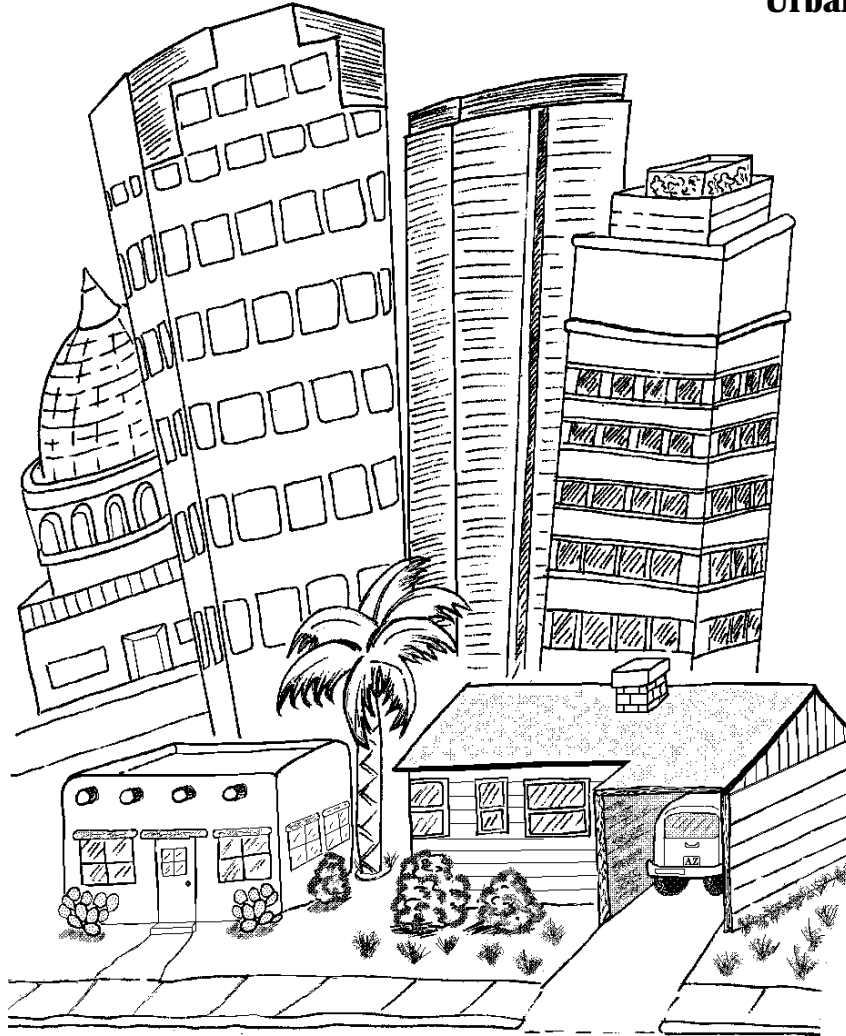
**flycatcher**

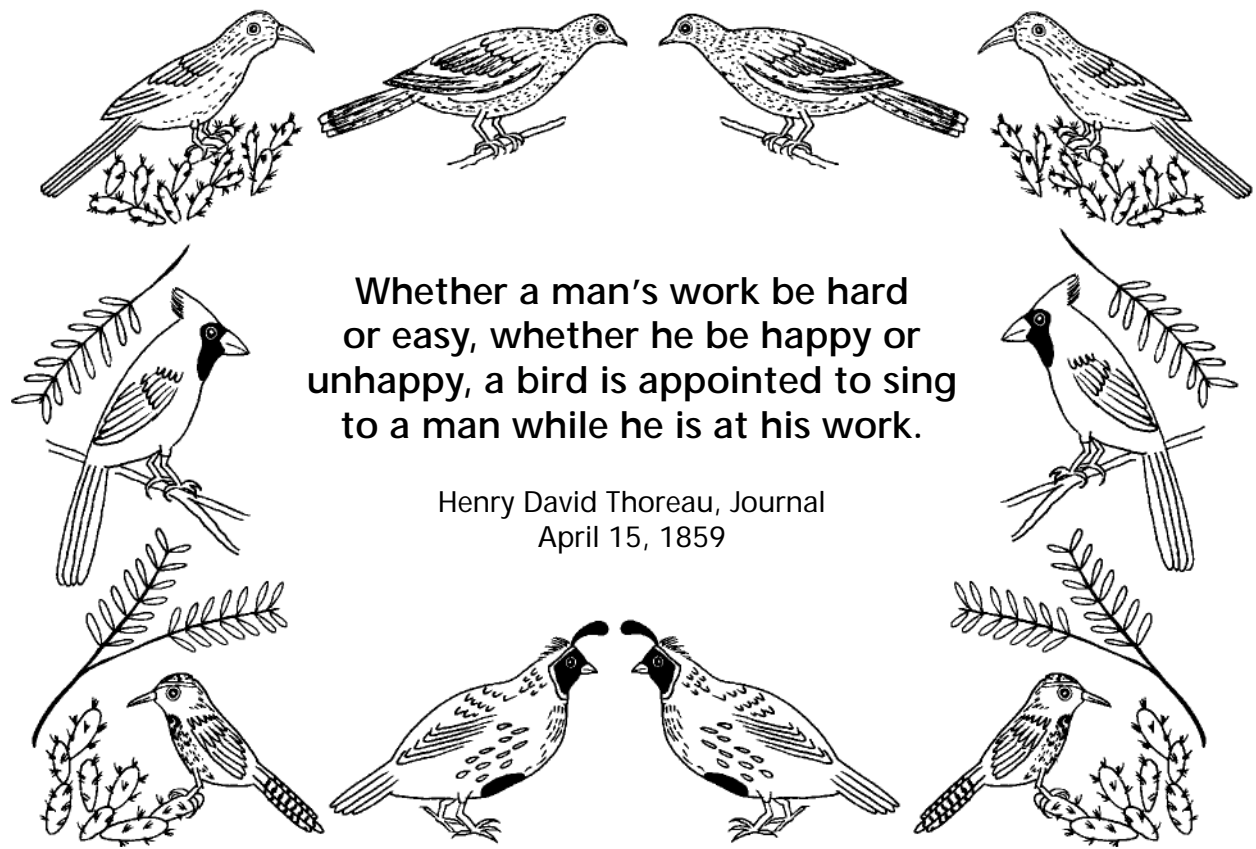


# Identifying Birds by Environment



## Urban





Whether a man's work be hard  
or easy, whether he be happy or  
unhappy, a bird is appointed to sing  
to a man while he is at his work.

Henry David Thoreau, Journal  
April 15, 1859





## ***Lesson Two: Birding in the Field***

### **Field Marks, Calls and Songs**

### **Learning to Use Binoculars**

### **Going on a Bird Walk**

### **Bird Identification Chart**



#### **Background**

A little preparation before a bird walk will ensure a more interesting and meaningful experience. If students are introduced to the field marks of the common birds, their songs and calls, and the habitat in which they are likely to be found they will have a better chance of finding the birds, identifying them, and experiencing the excitement of the quest.

Frustration in not seeing the birds because of unfocused binoculars will discourage children from the activity. Therefore, a lesson in how to use binoculars before the first class bird walk will provide a happier experience.

Walk the area in which you will introduce your students to birds. Look for areas where birds are perched, feeding, or nesting. This will give you an advantage in finding birds to show your students later.

**A kit containing the materials for Lesson Two  
may be checked out at Tucson Audubon Society.**

#### **Activity One – Identifying Birds by Field Marks and Call or Song**

##### **Materials:**

- Black and white illustrations of common birds showing field marks and silhouette—see Activity Six for a class project.
- Optional: Audio cassette tape of common bird calls and cassette tape player.
- Optional: Field guides or other books with color pictures.



**Focus:** With the use of simplified pictures showing field marks, and tape recordings of the birds, children learn to identify common local birds.

#### **Procedure:**

Do some field work prior to the lesson and determine which birds are the most common in the neighborhood. Choose no more than five or six at this time. (Later you may wish to expand the lesson and add additional birds.) Activity Six includes examples of black and white pictures and silhouettes of a few common southern Arizona urban birds. You may make copies of these



for this activity, or you may design your own by using pictures from bird books, calendars, and magazines and following the format in the examples.

With each illustration, note simple identifying field marks. If male and female differ, note the differences. Add a written description of the call or song beneath each illustration.

It is difficult to put bird sounds into words, so it is helpful to have the actual calls for the children to hear. The songs of all North American birds are recorded on Peterson Field Guides CD, *Western Bird Songs*, and Stokes *Field Guide to Bird Songs, Western Region*. The CDs are available at Audubon Nature Shop and other outlets. Record the birds you wish to use on an audio cassette tape. The songs are often short, so repeat them two or three times. On the CD, the name of the bird is given before each call. When you record the calls, include the name so that you and the students will know which call you are listening to. What is the difference between a song and a call?

A **call** is instinctive. It is a brief sound with a simple structure. It is usually made up of one or two syllables and may include four or five notes. Calls may serve as an alarm to warn of danger, an announcement that food has been found, or a signal of location to keep a mated pair, young, or a flock together.

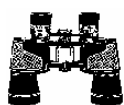
A **song** is partly or entirely learned. It is a more complicated vocalization. Bird songs have many functions. A male bird may sing to advertise for a mate, or proclaim his territory.

### The lesson:

1. Hold up the field mark and silhouette picture of each bird and briefly discuss the shape and field marks, which help us to identify the bird.
2. With each graphic play the tape recording of the bird's call.
3. As the students study the field marks, the silhouette, and the call of each bird they will have a better chance to identify it in the field. Explain that you may find birds on the walk that are not pictured here, but that will be an interesting challenge. It will give the students an opportunity to practice looking at identifying features which will help them find the bird in a field guide.
4. You may not wish to study all of the bird pictures in one day. You may break this lesson down to just a few birds at a time so students are not overwhelmed.

## Activity Two – Learning to Use Binoculars

**Materials:** binoculars



**Focus:** Children learn the proper use and care of binoculars. Binoculars are expensive, precision instruments. They are not toys. Children will value them if they learn how to use them and care for them properly.



**Procedure:**

Pass out the binoculars to students. Ideally each student has a pair, but since this is not always possible, sharing may be required.

Instruct students in binocular care. The rules may be posted. See Page 120 in the Appendix for a sample poster.

1. Do not touch the lenses with fingers or any objects.
2. Do not wipe lenses with any material other than lens-cleaning fluid and lens-cleaning tissue. (These are inexpensive and are available at drugstores and other outlets.)
3. Keep the strap around the neck at all times.
4. Do not drop binoculars, bump them into anything, or swing them around.

Instruct the students in adjusting binoculars:

1. Set the diopter (rotating lens) on the right lens so that the marks on the diopter and on the solid part of the binoculars line up. On some binoculars a 0 and a dot are aligned.
2. Move the hinged sides until your eyes feel comfortable looking through both lenses.
3. Look at a distant object through the binoculars.
4. Cover the right eye piece and focus the left eye piece by turning the center focus wheel until the view is clear.
5. Cover the left eye piece and focus the right eye lens with the diopter.
6. Now all that needs to be done is focus with the center wheel—no matter what the distance of the object being viewed.

Instruct the students on how to view objects through the binoculars:

1. Look at a distant object such as a sign, a branch of a tree, or the top of a pole with your eyes.
2. Do not take your eyes from the object as you lift the binoculars to your eyes.
3. As you look through the binoculars you should see the object through the lenses.

Go on the playground and allow students to practice using binoculars.

Upon return to the classroom establish the procedure for returning and storing the binoculars.

**Activity Three – Birding with Binoculars and Birding Etiquette**

**Focus:** The children are now able to identify some common birds and they have learned how to focus and find objects with binoculars. There is one more item of business before beginning the bird walk, and that is the etiquette or rules of conduct for good birders.



**Procedure:** Hold a class discussion and ask students what they think would be good rules to follow on a bird walk so that most people see the birds. Post the final list and review it before going on your bird walks. The list should include the following:

1. The teacher or assigned leader stays at the front of the line.
2. Birding walks are slow and quiet.
3. If someone sees a bird, that person should whisper to the others to describe its location rather than shout it out.
4. Do not extend the arm to point. That may scare the bird away. Keep the arm close to the body and merely extend a finger.

Note: There is an expanded list on page 122 in the Appendix, which includes of rules of conduct, helpful hints, and laws regarding birding.

## Activity Four – A Bird Walk Follow-up and Summary

**Focus:** Following each bird walk share the experience back in the classroom. The activity will aid students in remembering the birds they observed. This is also a good time to update a class logbook.

### Procedure:

Upon return from the walk students may share their observations with one another.

1. Which birds did they see?
2. Were the birds observed perched on a cactus, in a tree, on the ground?
3. Were they singing, perching, nesting, or flying?
4. Will you now be able to identify these birds when you see them again in your backyard, in a park, or in a walk in the desert? What clues will help you identify the birds?

A class logbook may be kept with notations made for each birding walk. If students are keeping bird observation in their journals they may make entries about the day's birding experiences and add illustrations. See **Activity Five** for observation recordings.

## Activity Five – Recording Observations



**Focus:** Students make a folder or notebook of their observations. There are so many things to think about as one observes a bird, so the following charts will be helpful in reminding students about what to look for and will help them organize information.

### Procedure:

**Table #1** (Page 23) is an introduction to using the chart. Give each student a copy for the lesson, then instruct them to add this page to their observation notebook for future reference.



Look over the chart and discuss the observations one could make regarding field marks, behaviors, habitats, and songs.

**Table #2** (Page 24) is a sample chart of an observation of a Curve-billed Thrasher. Look over the chart and note how it was filled out.

**Table #3** (Page 25) is a blank chart for students' use.

Here is a fun exercise that will give students an opportunity to practice using the chart. Find pictures of unusual birds such as toucans, storks, and others with interesting adaptive features. Students chose a bird, and as they study its shape, bill, feet, and other features, they fill in the appropriate blanks on the chart.

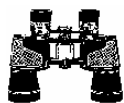
## Activity Six – Make a Classroom Bird Identification Book

### Materials:

Field guide

Copy machine

Loose-leaf binder



**Focus:** Students create a simple classroom identification guide by photocopying a few of the common neighborhood birds and jotting down their main characteristics.

### Procedure:

Determine the common bird species of the school neighborhood. (Rock Dove, House Sparrow, European Starling, Cactus Wren, Mourning Dove, and Curve-billed Thrasher would be excellent choices for starters.) Look in field guides for their pictures. Make two copies of each. Color one completely black for the silhouette. Write in a few obvious field marks or other identifying features and a description of the song or call.

For each species arrange the two pictures and information on 8 1/2 x 11 inch paper and insert it in a Bird Identification loose-leaf binder. Add to the binder as you discover more birds.

In addition to the visual aids, you may wish to add the calls of each bird in your collection. See Page 135 in the Suggested Reading, Listening, and Viewing in the Appendix for sources of bird call recordings.

On the next page are three examples of entries for a Bird Identification Book.



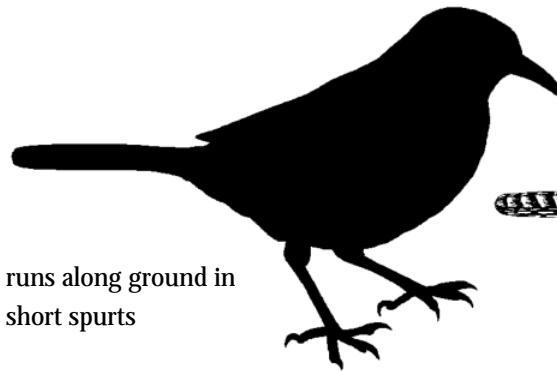
### Taking Flight – The Assembly and Maintenance of a Classroom or School Binocular Kit

A classroom project assembling and organizing a binocular kit and being responsible for maintenance is an excellent way to get students involved in the care and use of these scientific tools. Your students can develop a binocular kit for the classroom or the entire school, to be checked out by individual students or classes involved in bird study. See Page 121 in the Appendix for directions and ideas.



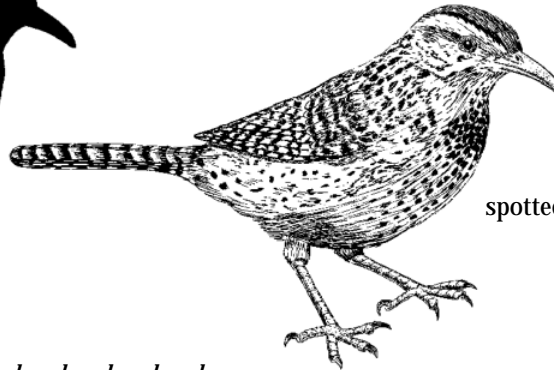
## Classroom Bird Identification Book – Sample Page

### Cactus Wren



runs along ground in short spurts

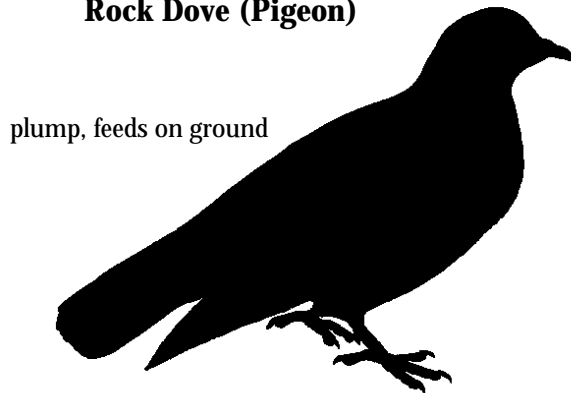
brown cap, white streak above each eye,  
brown and white streaked back



spotted breast

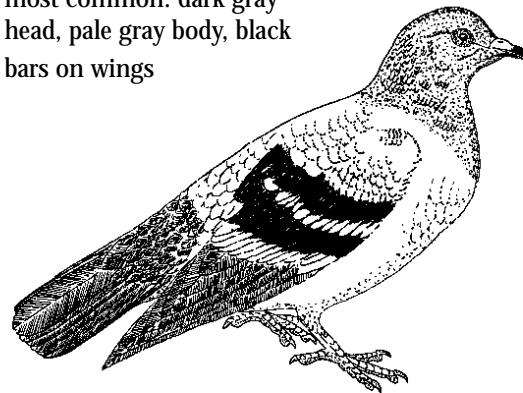
voice: harsh *cha cha cha cha cha*

### Rock Dove (Pigeon)



plump, feeds on ground

most common: dark gray head,  
pale gray body, black bars on wings



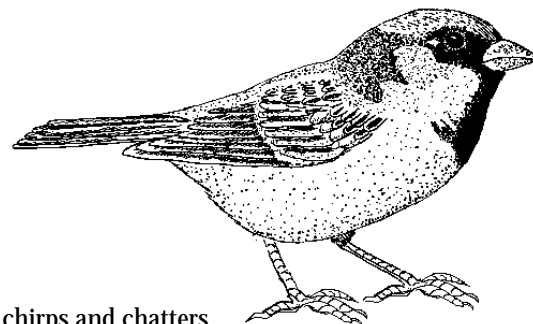
breeders have developed many colors and patterns

### English Sparrow



small, plump, hops on ground looking for food

male has gray crown, black throat, white cheeks  
female has streaked back, tan eye stripe



voice: a variety of chirps and chatters



## WHAT BIRD IS THAT? – HOW TO LOOK AT A BIRD

There is so much to think about when observing a bird. A table listing things to observe will help beginning birders remember what to look for.

**TABLE #1 – Things to look for as you observe a bird**

**Date of observation:** \_\_\_\_\_ **Place:** \_\_\_\_\_ **My Identification:** \_\_\_\_\_

<b>FIELD MARKS</b>	
Size	Compare to a bird you know, such as the Cactus Wren
Shape	Sketch the shape
Eyes	Is there a stripe over the eye? An eye ring? What is the eye color?
Color and pattern	Describe colors, spots, stripes
Bill	Sketch the bill shape
Legs and Feet	Sketch the legs and feet
Tail	Sketch the tail
Wings	Are the wings rounded, pointed, narrow, wide?
<b>BEHAVIOR</b>	
Movement on ground	Does the bird walk, run, run then stop, hop, etc.?
Movement above ground	Does it sit still within a tree, hop from branch to branch, etc.?
Flight pattern	What pattern does the bird make in the air as it flies?
Posture	How does it stand...tall? Parallel to the ground?
Feeding	Where is it feeding? What is it eating?
Other behaviors	Bathing, preening, nest-building
<b>HABITAT</b>	
General habitat	Is the bird in a city park or yard, in the desert, at a pond?
Specific habitat	Is the bird on the ground, in a tree, cactus or pole, on a building, etc.
<b>SONG OR CALL</b>	
Song or call description	Write anything that will help you remember the sounds.

Make one or more sketches to help you remember the bird. Note the shape, posture, bill, tail, spots, stripes, colors, and other features.

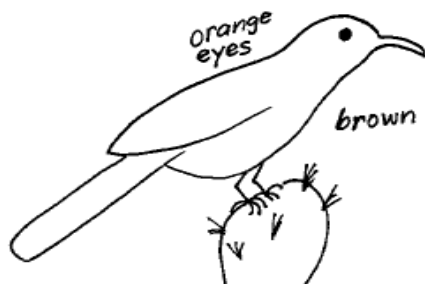


## WHAT BIRD IS THAT? – HOW TO LOOK AT A BIRD

**TABLE #2 – Sample Table of Observations of a Curve-billed Thrasher**

**Date:** March 25, 2001     **Place:** Lincoln Park     **My I.D.:** Curve-billed Thrasher

<b>FIELD MARKS</b>	
Size	A little bigger than a Cactus Wren.
Shape	(Sketch the shape below)
Eyes	Yellow/brown eyes. No marks
Color and pattern	Brown, light breast.
Bill	Long and curved
Feet/legs	(Sketch the feet and legs)
Tail	Long tail, square tip
Wings	(Sketch the wings)
<b>BEHAVIOR</b>	
Movement on ground	Runs
Movement above ground	Perches on branches then flies to ground poking for food.
Flight pattern	Straight flight
Posture	Stands with body parallel to the ground
Feeding	Pokes its bill under rocks, finding insects
Other behaviors	
<b>HABITAT</b>	
General habitat	In a yard with lots of cactus.
Specific habitat	Usually on the ground, sometimes perched on cactus or branches.
<b>SONG OR CALL</b>	
Song or call description	A loud TWEET TWEET. Also a pretty song.



# WHAT BIRD IS THAT? – HOW TO LOOK AT A BIRD

TABLE #3 – My Observation Record

Date: \_\_\_\_\_

Place: \_\_\_\_\_

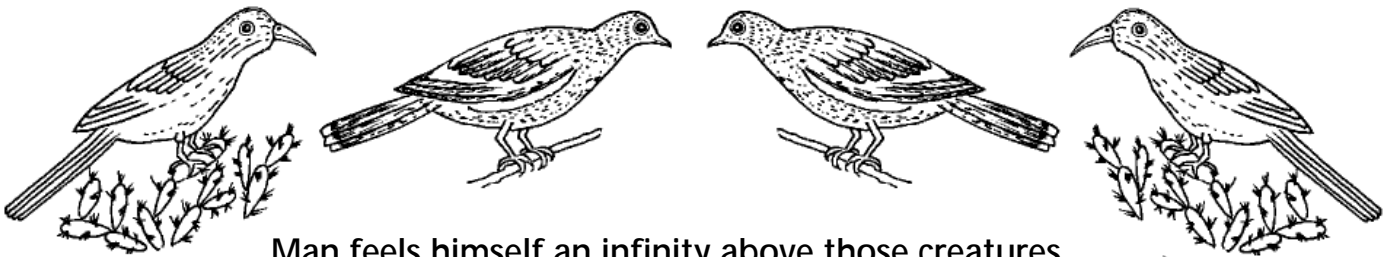
My I.D.: \_\_\_\_\_

<b>FIELD MARKS</b>
Size
Shape
Eyes
Color and pattern
Bill
Legs and Feet
Tail
Wings
<b>BEHAVIOR</b>
Movement on ground
Movement above ground
Flight pattern
Posture
Feeding
Other behaviors
<b>HABITAT</b>
General habitat
Specific habitat
<b>SONG OR CALL</b>
Song or call description

**Make a sketch of the bird on the back side of this sheet.**

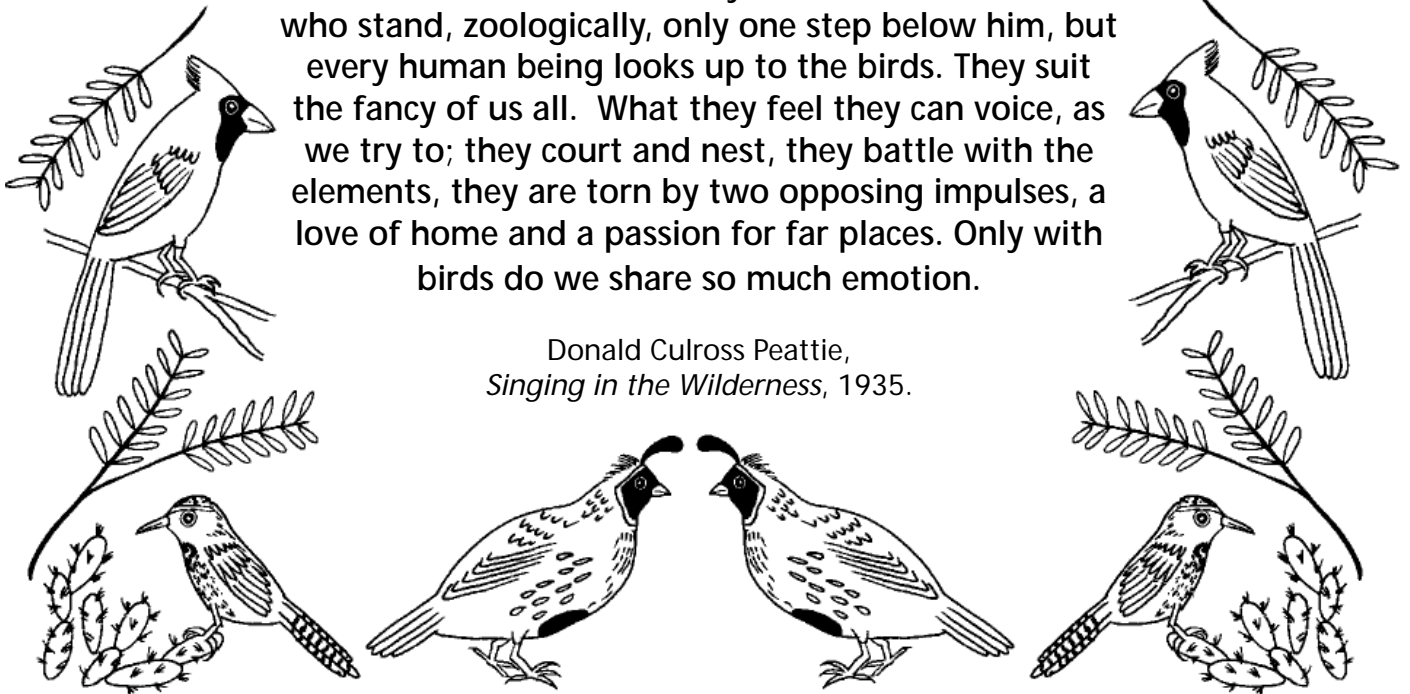


Draw or sketch your bird here.



Man feels himself an infinity above those creatures who stand, zoologically, only one step below him, but every human being looks up to the birds. They suit the fancy of us all. What they feel they can voice, as we try to; they court and nest, they battle with the elements, they are torn by two opposing impulses, a love of home and a passion for far places. Only with birds do we share so much emotion.

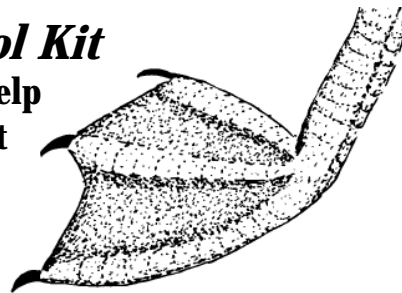
Donald Culross Peattie,  
*Singing in the Wilderness*, 1935.





## ***Lesson Three: A Bird's Tool Kit***

**Bills, Eyes, Wings, and Feet Help  
Birds Find the Food They Eat**



### **Background**

This lesson illustrates how the various adaptations of bills, eyes, wings, and feet assist birds in finding and eating food. **Form** and **function** are emphasized as students examine familiar birds common to the Tucson area.

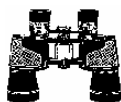
*Adaptations* allow animals to survive in their environments. These adaptations may be physical (anatomical), physiological (bodily functions), and/or behavioral. When we look at an animal and study its shape, size, teeth, eye placement, feet, color and other physical features that help determine how and where it lives, we are looking at *indicators of niche*. *Niche* refers to an animal's role in the environment, especially its place in the food cycle.

**A kit containing the materials for Lesson Three  
may be checked out at Tucson Audubon Society.**

### **Activity One – Introduction**

#### **Materials:**

Pictures of a hummingbird, hawk, and duck. (Pictures may be found in magazines, books, and calendars.)



**Focus:** Bird adaptations are especially interesting because they usually are easy to see and take on so many forms. In this lesson we will concentrate on a bird's built-in tool kit—bills, eyes, wings, and feet—and how they help birds find food, catch or procure it, and eat it.

#### **Procedure:**

Ask the class to think of birds they know and picture them in their minds.

- What do all birds have in common? (Possible answers: bills, wings, feathers, two feet.)
- Now think of ways they are different. Name some differences. (Possible answers: color, size and shape of the bird, size and shape of the bill, wings, and feet, where they live.)

Put up pictures of a hummingbird, hawk, and duck, and discuss:

- These are all birds—they have feathers, wings, two feet, and a bill, but they look quite different from one another. In what ways are they different?
- Notice especially the bills, eyes, wings, and feet. In what ways are these important to a bird? (Possible answers: they help them find food and escape predators.)



## Activity Two – Bird Bills

### Materials:

See the chart below for the pictures, tools, and food needed for this demonstration. You need not use all eight examples. Find pictures in magazines, books, or calendars.



### Focus:

In this activity students examine pictures of the birds, the tools that simulate different bird bills, and food types. Then they group the picture, tool, and food for each species.

### Procedure:

Before the lesson prepare the following:

- float bits of Styrofoam in bowl of water
- place plastic insects under rocks
- sprinkle rice onto piece of wood
- scatter the tools (bird bills) and food items on a table

The students gather around the table and look at the items. Explain that they are going to match a picture of the bird with a tool that resembles the bird bill. Then they will determine which food item would best be suited for that bird bill.

Hold up a picture of a bird. Ask the students which tool resembles the bill of that bird. The child that answers may pick up the tool. Now ask which food item on the table would be eaten by a bird with that kind of tool for a bill. The child who answers may pick up that food. Experiment with the tool and the food. Examples: the needle-nosed pliers-like bill of the woodpecker can pick insects out of the Styrofoam log; the eyedropper and protruding brush simulate the hummingbird's bill and tongue which can dip deep into a flower. The chart below will help you match the species to the tool and the food.

As students match the bird to the tool and to the food, allow them to discuss their choices and

SPECIES	TOOL	FOOD
Gila Woodpecker	needle-nosed pliers	beads in styrofoam (insects in wood)
Cactus Wren	tweezers	rice in log (insects in wood)
Curve-billed Thrasher	small hair clips	insects under rocks
Cardinal	pliers	peanuts to be cracked
Hummingbird	eyedropper with brush	flowers
Roadrunner	large hair clips	lizards, snakes, scorpions, centipedes
Hawk	vice grip	mouse
Duck	tea strainer	styrofoam bits in water



Discuss the concept of *niche* as a natural history term. Niche refers to the “job” of an animal (or plant) within an ecosystem with reference to other organisms. An important aspect of an animal’s niche is the food an animal eats. We can often figure out an animal’s niche by looking at its structure. Birds are excellent specimens for determining niche because of their highly adapted bills, feet, and other body forms.

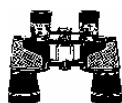
### Activity Three - Bird Eyes

**Materials:**

See the chart below for the pictures needed.

Find pictures in magazines or books.

SPECIES	EYE PLACEMENT	FOOD
owl	forward facing	rodents
roadrunner	forward and downward facing	snakes, lizards, insects
cardinal	on the sides of the head	seeds and berries
hummingbird	on the sides of the head	flower nectar



**Focus:**

The placement of a bird’s eyes is another indicator of niche. It is a clue as to the kind of food the bird eats.

**Procedure:**

Hold up a picture. Ask the students to examine the eye placement. How would forward facing eyes help a bird that hunts for moving prey? How would side placed eyes help a bird that eats plant material? Possible answers are:

- Forward facing eyes in birds and other animals helps them locate prey that is running away. This is an example of *binocular* vision.
- It also provides three-dimensional vision or depth perception, which helps predators judge distance as they pounce upon moving prey. This is an example of *binocular* vision.
- Eyes placed on the side of the head allow a bird to watch for predators as they eat. They have some three-dimensional vision directly ahead, but as they feed on plant material those side-facing eyes can be on the lookout for possible danger. This is an example of *peripheral* vision—the area of vision lying just outside the line of direct sight.

Students may collect pictures that show eye placements on different types of birds and place them in their folders. Below each picture they may write in the type of food eaten by the bird.



## Activity Four - Bird Feet

### Materials:

See the chart below for pictures needed. Find pictures in magazines, books, or calendars. Rubber models of bird feet may be obtained from environmental teaching supply companies. Refer to the Resources section.

SPECIES	DESCRIPTION	FOOD
hawk	strong talons—good for catching and holding active prey	mice, squirrels, snakes
duck	webbed—good for paddling, especially for ducks that upend and paddle in place while they eat from pond bottom	water plants, seeds, insects, tadpoles, fish, worms
coot	lobes along length of toes—good for swimming and diving; they flare out on the backstroke, propelling the bird forward, then fold back on the forward stroke, the long lobed toes are also good for walking on soft mud without sinking	plant material, algae, insects, tadpoles, fish, worms, snails, crayfish, eggs
woodpecker	two toes forward and two toes backward—give solid grip on vertical tree trunks (short, stiff tail feathers prop against the tree which brace the bird as it pecks)	insects living in tree wood; it also hides nuts in holes it has pecked in wood



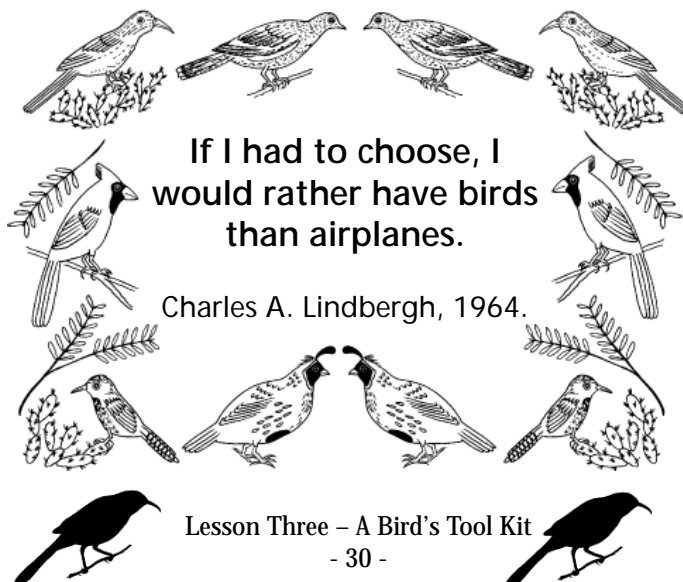
### Focus:

Bird feet are also an indicator of niche.

### Procedure:

Display each picture and ask students to describe the feet and how they could act as tools for getting food. Refer to the chart for possible responses. Discuss the concept of niche as it relates to this activity.

Students may collect pictures that show the feet of different types of birds and place them in their folders. Below each picture they may write in the type of food eaten by the bird and how the feet help the bird procure the food.



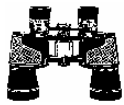
## Activity Five - Bird Wings

**Materials:**

See the chart below for pictures needed.

Find pictures in magazines or books.

SPECIES	DESCRIPTION	FOOD
swallow	long, pointed—good for speed and maneuvering	flying insects
red-tailed hawk	broad wings—good for soaring on lifts of rising air	rodents, rabbits, reptiles, insects, birds
quail	stubby wings—good for quick takeoffs and dodging trees	seeds, leaves, berries
hummingbird	wings can beat very fast and at different angles—good for hovering in one spot as they feed on nectar	flower nectar, insects, spiders

**Focus:**

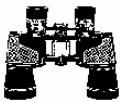
The shape and size of the wings may also indicate the niche of a bird.

**Procedure:** Follow the procedure from the preceding activity.

## Activity Six – Summary

**Materials:**

Pictures of a variety of birds showing different types of bills, feet, wings, and eyes. *The Bird Alphabet Book* by Jerry Pallotta contains excellent examples of birds in many habitats.

**Focus:**

Students examine the structure of birds not yet studied and try to determine niche.

**Procedure:** Students look at pictures of birds that the group has not yet talked about. These may be species not found in Arizona. Ask the group to describe the bill, eye placement, wings, and feet of each bird. Using these as clues, ask the students to determine the type of food the bird eats.

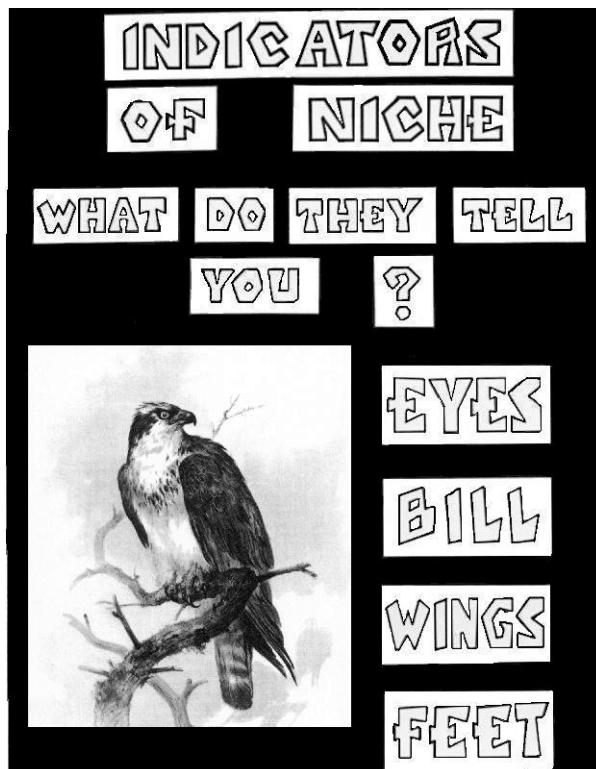




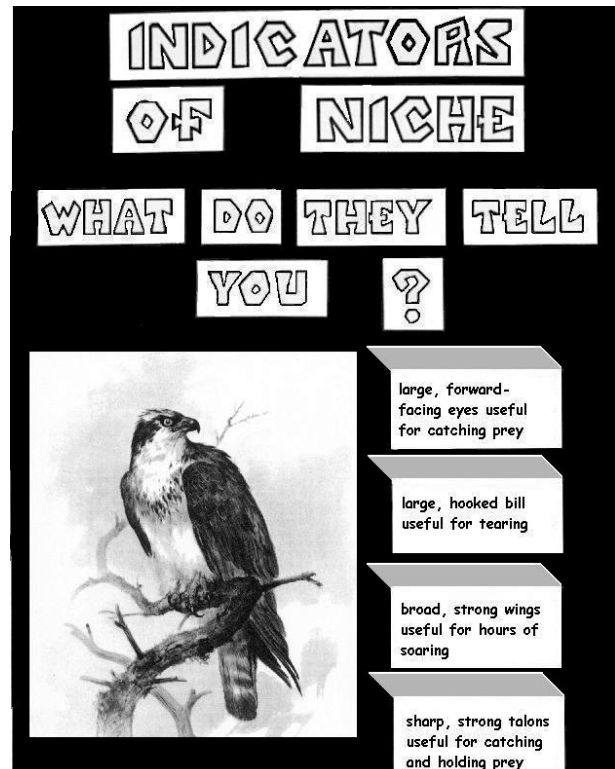
## Taking Flight -- *Indicators of Niche* Interactive Posters

Divide students into groups and direct each group to find a large picture of a bird and determine the functions of the bill, wings, eyes, and feet. Then they fold four index cards in half, lengthwise, to make flaps. The word EYES is written on the top of one flap, BILL on another, WINGS on another, and FEET on the last. On the inside of the flap they write a brief description of each bird tool and how it assists the bird in getting food.

Arrange the picture and cards on posters that may be shared and displayed in the classroom.



Poster with flaps down



Poster with flaps lifted

## Fantasy Birds

Let imaginations soar as students make up a bird species that lives in a fanciful habitat. Each student (or a small group working together) thinks of the kinds of “tools” the bird needs to survive as they invent specialized bills, eyes, wings, and feet the bird would need in order to find and eat food that would be available in the make-believe land. Students illustrate their birds and note how the “tools” are used.

A variation of this activity can be found in *Project WILD's Adaptation Artistry*.





## ***Lesson Four – Very Urban Birds***

### **European Immigrants**

### **The Expanding Range of Some Natives**

**Background:** Three non-native species of birds inhabit all urban areas of the United States as well as other cities throughout the world. How did they get here? Why are they most common in cities? Are they threats to native birds? Some birds native to North America are expanding their ranges northward. Why is this happening? These are questions students will explore in this lesson.

#### ***The immigrants:***

The **European Starling**, **House (English) Sparrow**, and **Rock Dove (pigeon)** are the most common birds in any urban area—from the cold north to the hot south; humid or dry—throughout much of North America as well as in cities in other parts of the world. These birds are not native to the New World; yet they seem to thrive in any urban area. Where did they come from and why are they here? The answers to these questions make interesting research projects. Following is background information about each of these birds.

#### **European Starling**



Everyone has seen starlings. They are dark, chunky, sharp-billed, short-tailed birds that walk around city streets and parks with short jerky steps. In the spring breeding season they show an iridescent purple green and have yellow bills. In winter they are darker but with many light speckles and have dark bills. In the daytime they feed in urban areas and farmlands. At night large numbers come together to roost in trees. Their calls are a continuous series of squawks, squeals, whistles, and chuckles.

The European Starling, as the name suggests, is a native of Europe and Great Britain. It was deliberately introduced into North America through a most unlikely circumstance. The goal of The American Acclimatization Society was to bring into the United States every species of bird in William Shakespeare's works. In *Henry IV* starlings

This section is designed to supply the teacher with background information on the subject. The students do their own research as they work on the activities. Research questions are provided with each activity.



are mentioned. In 1890 sixty starlings were introduced to New York City's Central Park, and the impact of these few birds changed the North American avian world forever. The starlings thrived and reproduced. Their range moved westward across the continent, taking over the habitats of native birds. Within 60 years they reached the Pacific Coast. One century after their introduction 200 million starlings occupied most of the United States, southern Canada, and even southeastern Alaska, making it one of the most abundant species on the continent.

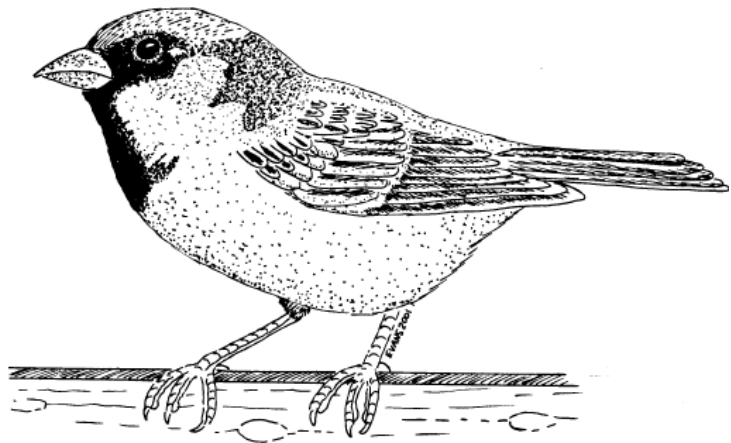
The starlings were able to live in the varied climates of our large continent, as long as they had food and shelter. Humans offered both. About half of the starling's diet is insects. The other half is made up of seeds and fruit. Agricultural areas provide insects and seeds from grain and other crops. Cities offer insects, weed seeds, and food scraps people leave on the ground. The birds are cavity nesters and seek out woodpecker holes for their homes, often evicting the woodpeckers who carved out the cavities. They also compete with bluebirds and other native birds that nest in cavities. In cities they have no problem finding nest sites in crevices of buildings.

In addition to taking over nest holes of native birds, they make those nests unusable after they leave. Grasses and a variety of debris items make up their messy nests. They keep the nests clean for the newly hatched young, but after the babies have grown feathers, the adults no longer need to remove fecal sacs or add fresh nest materials. The nests become filthy with fecal material and soon are infested with mites. This is no problem for the starlings, but when they finally abandon the nests the native cavity nesters cannot tolerate these conditions and must find other quarters.

Starlings not only impact native birds, but they are problems for humans, too. They eat the farmer's grain, they damage crops, and their droppings cover buildings and sidewalks. They may even transmit disease. Many starling control programs have been tried, but none have been successful. Even when many are killed it doesn't seem to put a dent in the European Starling population.

### House Sparrow (English Sparrow)

This is another common urban bird that even the most nonobservant city dweller has seen. It is a small bird. The males have a distinctive black throat, white cheeks, and chestnut nape. Females lack those markings and are otherwise a dull colored version of the male, with a streaked back, unstreaked breast, and faint eye stripe. The song is a monotonous ***chirrup-chirreep-chirrup***.



It is a native of Great Britain, most of Europe, Asia, and Africa. About 1850, eight pairs of English Sparrows were introduced into Brooklyn by Nicolas Pike, director of Brooklyn Institute because people liked the birds they remembered from their homeland and thought they would control insect pests. Those first birds died, so Mr. Pike returned to England and brought back a large number. They were released into a Brooklyn cemetery in 1853. This group took to their new land and reproduced. Other English Sparrows were introduced in other parts of the United States and Canada. They



covered the continent faster than the starling. By 1940 they could be found throughout the United States and north into Canada.

The House Sparrows are much like the European Starlings in their food and habitat preferences. They do well around humans, in urban areas and agricultural lands. They eat insects, spiders, seeds, flowers, and any crumbs people leave on the ground. They also make their nests in cavities and will destroy eggs and young of other birds as they take over a nest. But they can make nests outside of cavities as well, constructing ball-shaped grass nests in tree branches, and in a variety of human-made structures including nooks of buildings, under eaves of homes, in stop and go lights, and in the letters of large signs on store fronts.

This sparrow is not related to the native American sparrows. It is actually a weaver finch, an Old World family of birds, native to the British Isles, Europe, Asia, and Africa.

### **Rock Dove (Pigeon)**

The Rock Dove has been a part of people's lives for thousands of years. It was domesticated about 4500 B.C., probably for meat, then later as a message carrier because of its remarkable instinct to fly long distances and accurately find home—thus its other name,—“homing pigeon.” By the 16<sup>th</sup> Century there were actually pigeon post offices where the public could, for a fee, use pigeons to send messages.



Rock Doves are native to Great Britain, Norway, western Europe, Russia, China, north Africa, and India. In 1606 domesticated pigeons were brought to North America and introduced first in Nova Scotia and later into Virginia and Massachusetts. They were used for food, message carriers, and as racing pigeons for hobbyists. It wasn't long before some escaped and established feral (untamed) populations across the country.

They, too, are at home in human habitation. They eat grain, seeds, grasses, berries, and most any table scraps. The nest is a flimsy platform of sticks, twigs, and grasses. Their original roosts were in sea cliffs and caves. But ledges and rafters in buildings and bridges make perfect substitutes.

They are less fearful of humans than most birds and will readily eat out of the hands of the people who feed them. Pigeons have no trouble finding people in city parks offering handouts.

Rock Doves come in a variety of colors, and breeders have developed many kinds of fancy feathered pigeons for show, but in feral populations their original colors are the most common—a dark gray head, gray body, white rump, two black bars across the wings, and iridescent purple-green feathers at the neck.

The three immigrants discussed above thrive in urban and agricultural settings. They are seldom seen in natural environments away from human habitation.

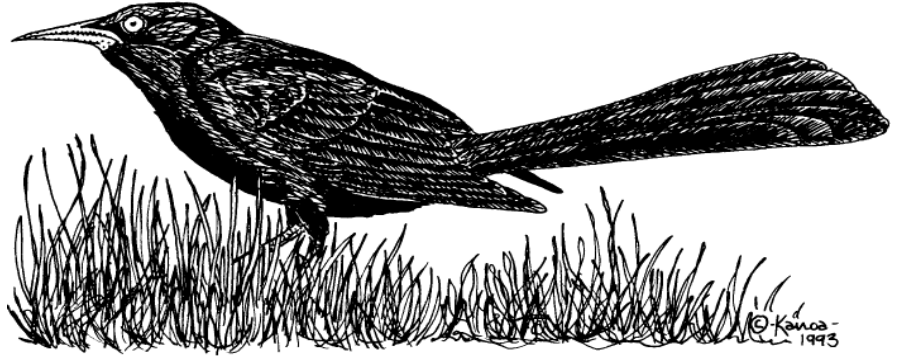


### ***The native opportunists:***

In addition to the immigrants brought in from other continents and easily adapting to their new home, there are native species who are expanding their ranges as human activities create a habitat that suits their needs. The following are two birds whose ranges have expanded to include urban Tucson.

#### **The Great-tailed Grackle**

This bird is expanding its range in the southwest. It is following the spread of agriculture and irrigated urban areas. It seeks out city parks, golf courses, baseball fields, lawns, and any place where water is available.



#### **Brown-headed Cowbird**

This bird was originally a Great Plains species. It lived in the grasslands where bison grazed, feeding upon insects associated with the bison habitat. It was not a bird of dense woods. But as forests were cleared and replaced by pastures, the cowbirds moved in and now occupy lands far from their original range. It was an easy transition to go from bison country to cattle country. As urban areas grew the Brown-headed Cowbird found these equally inviting habitats.

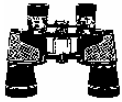


The male is glossy black with a brown head. The female is a non-descript pale brown. The song is a watery gurgle along with high, thin squeaky notes. The Bronzed Cowbird is a related species but it occupies only the arid southwest, Mexico, and Central America.

Cowbirds are a major threat to many birds in their new territory because of nest parasitism. The **Taking Flight** activity (page 40) introduces the interesting story of nest parasitic behavior of cowbirds.



## Activity One – Adaptability of the Immigrants



**Focus:** Students do research to learn why some birds survive in urban environments among people and man-made structures, while others cannot.

### Procedure:

Conduct a class review of the three urban, non-native birds: the European Starling, House Sparrow, and Rock Dove. Students should now be familiar with these common species. Review their appearance, calls, and observations students have made of these birds. You may tell the students the stories of how they arrived in North America.

What is there about the feeding habits and behaviors of these birds that have allowed them to do so well? Why do they stick so closely to human habitation? Ask the students for questions that would lead to research about the habits of these birds that would give us clues to their successful survival. Write the questions on the board. They may look something like this:

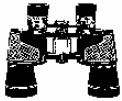
- What do these birds eat?
- Do cities and farms supply those foods?
- What was their original (native) habitat?
- Where did they build nests and roost before there were cities?
- How are our urban and agricultural habitats similar to their native habitat?
- Does it provide nesting and roosting sites?
- Why were other birds introduced into North America not able to survive?

These research questions will help children understand how human-introduced food supplies and human replication of nesting and roosting needs invite some species to city living.

Children learn that the varied diet of these birds allows them to eat all types of food. Humans provide structures or plantings that imitate their original nesting and roosting sites. They may also note that buildings offer warm places in winter, and artificial light allows for a longer feeding day. Traffic noise and closeness to humans does not seem to upset them. Extermination efforts haven't made a dent in their populations.



## Activity Two – Pros and Cons of Non-native birds



**Focus:** Students use their research information to discuss the advantages and disadvantages of non-native birds.

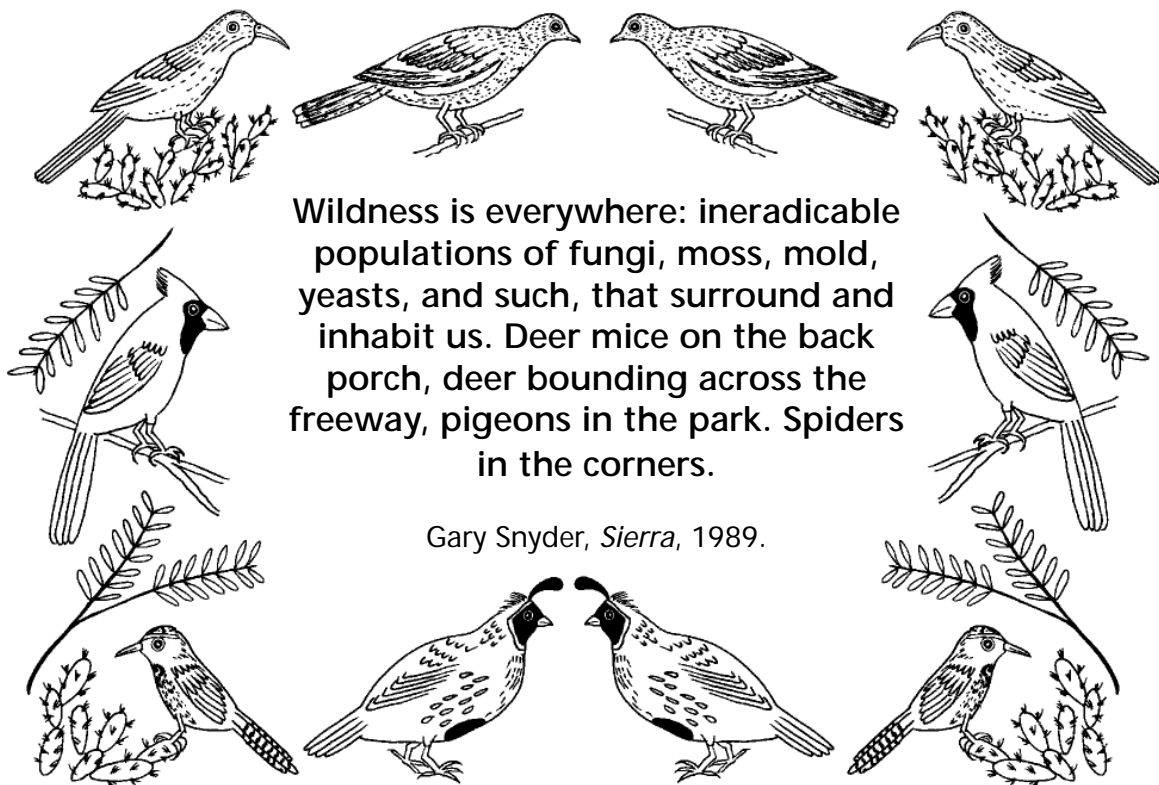
**Procedure:** After reading about the three non-natives in reference materials children discuss the advantages and disadvantages of our immigrant birds. Why they may be admired and encouraged some times, but not at other times. They may come up with something like this:

### Pros:

- People enjoy feeding and watching them in parks and windowsills, especially in big cities where this is the only “wildlife” they see.
- We can get up close to them and study their behaviors.
- They eat up food scraps dropped in parks and on sidewalks.
- They are food for Peregrine Falcons.

### Cons:

- They take over habitats of native birds.
- They make messes on buildings and statues.
- Their high populations may spread diseases to other birds and humans.
- They eat all the seeds at the bird feeder.

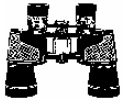


Wildness is everywhere: ineradicable populations of fungi, moss, mold, yeasts, and such, that surround and inhabit us. Deer mice on the back porch, deer bounding across the freeway, pigeons in the park. Spiders in the corners.

Gary Snyder, *Sierra*, 1989.



## Activity Three – Counting Birds



**Focus:** After students have learned to identify the three immigrant bird species, and perhaps other common city park dwellers such as Great-tailed Grackles, Curve-billed Thrashers, and Inca Doves, they visit a nearby park and make a count of species and numbers.

**Procedure:** Each child, or team, stays in one place and counts the number of individual birds of each species for a number of minutes. Back in the classroom these may be added up or averaged. Do this activity monthly throughout the year and record observations on a master chart. Do this activity three or four times each month to get a more accurate picture.

Here is an example of a chart to help them keep track of their counts. The chart will help students see which species are most common. The results may be shown with a bar graph.

Urban Bird Count			
Location _____	Date _____	Time of Day _____	Weather _____

Species	Tally
Rock Dove (pigeon)	
European Starling	
House Sparrow	
Great-tailed Grackle	
Inca Dove	





## **Taking Flight**

### **Mapping Expanding Ranges**

Children research the ranges of the Brown-headed Cowbird and the Great-tailed Grackle prior to human development of the land and color those ranges on maps of North America. Then they research the present ranges and with different colors indicate the areas now occupied by these birds. This is a graphic illustration of the tremendous expansion of these birds in a relatively short time.

### **Operation Pigeon Watch**

Check into the Pigeon Watch program being offered by Cornell University at their website at <http://birds.cornell.edu/ppw/> and go to the Operation Pigeon Watch pages. A great deal of pigeon information is available there as well as the opportunity to involve your students in an international research project that involves people of all ages and locations in a real scientific endeavor. People participate by counting pigeons, noting the color varieties, and recording courtship behaviors observed in their neighborhood pigeon flocks.

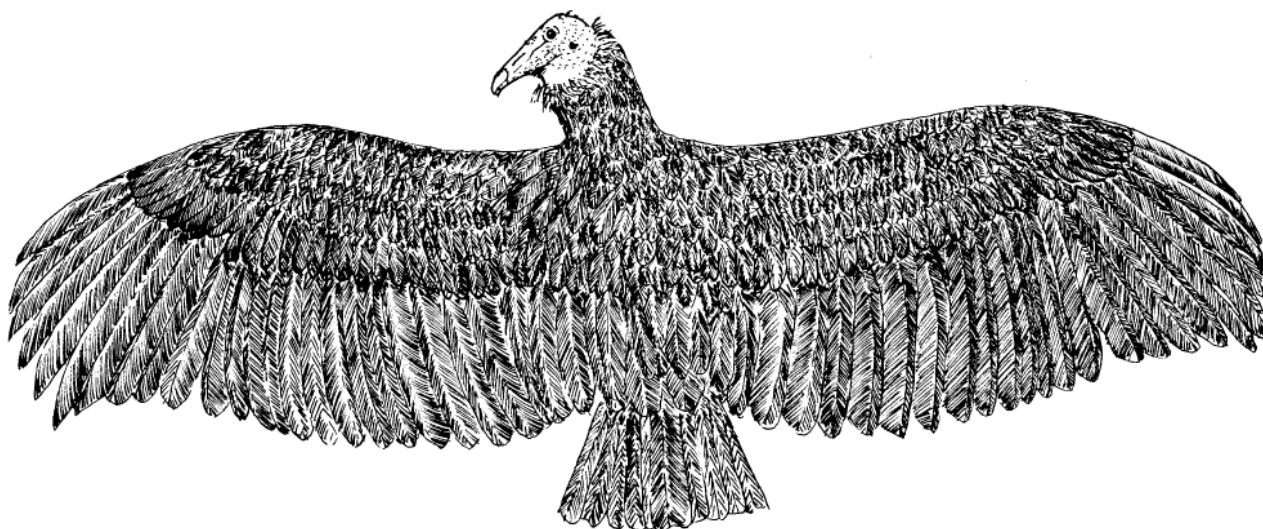
### **Nest Parasitism**

The nest parasitism of cowbirds is a fascinating study. These birds never make nests. Instead the females seek out nests of host birds. A female lays one egg, destroys one of the host's eggs, and leaves her egg to be hatched and the nestling raised by the unsuspecting host birds. In its original range, other bird species often recognized the unwelcome egg and destroyed it. But as the Brown-headed Cowbird moved into the home ranges of other birds, those birds didn't recognize the replacement egg, and raised the young cowbirds as if they were their own.

As students read about the strategies of cowbird egg-laying, the reactions of host birds, and the impact of the cowbirds on native bird populations, they may have spirited discussions on the advantages of nest parasitism and the threat to other birds.

Which birds recognize cowbird eggs? Which birds commonly raise baby cowbirds? Will more host bird species learn to destroy cowbird eggs? Will some native bird species become extinct because of the cowbird?





## ***Lesson Five – Desert Adaptations of Birds***

### **How Birds Survive Desert Conditions**

#### **Observing Bird Behavior in Temperature Extremes**

**Background:** Birds live in deserts, but most do not have specialized desert adaptive features, as do mammals and reptiles. Birds can fly to water and to cooler areas. Mammals and reptiles are confined to narrow ranges on the desert floor where they find refuge in vegetation or in underground burrows and must sacrifice some water loss by evaporative cooling through panting or perspiring. It is not known if desert birds can endure greater water loss than non-desert birds, but here are some features of bird behavior, ***morphology*** (anatomy), and ***physiology*** (bodily processes) that assist in their survival.

This section is designed to supply the teacher with background information on the subject. The students do their own research as they work on the activities. Research questions are provided with each activity.

Birds have many inherent behaviors and characteristics that allow them to inhabit desert conditions. Birds have a high body temperature—often above 104°—much higher than other vertebrates. Therefore they do not have to cool their bodies until the air temperature exceeds their high body temperature. They can even tolerate body temperatures 5 or 6 degrees above their normal temperatures. Even on very hot desert days the shade of trees and shrubs does not exceed 110°.

The mechanism for heat loss from birds involves direct radiation of body heat to areas of lower temperature—the air. This direct radiation does not require water loss through evaporative cooling. But temperatures can climb above this and few birds can survive a body temperature of more than 115°.

Birds can avoid high temperatures through their behavior, as well. They are active in the cooler times of early morning and late afternoon. During the hotter parts of the day they seek shade. For many birds, flying is limited during hot times because the exertion of flight raises body temperatures. But birds that fly and soar high above are in cooler air.



The position of the feathers in a resting bird help cool its body. On hot days birds compress their feathers, which eliminates the insulating air space between the feathers and the body thus allowing heat to escape to the air. Their flattened feathers make them look unusually thin. It is just the reverse on cool days. Observe how birds on cool mornings appear fat, as they fluff out their feathers, forming that insulation space. Birds also radiate excess heat by raising their wings and exposing the sparsely feathered sides of their bodies and underwings. Vultures perch on the tops of saguaros or utility poles with outstretched wings, increasing their body surface area and dissipating body heat to the air—see the sketch at the beginning of this lesson.




Another heat-losing strategy is the dilation of blood vessels that go to the legs. This sends warm blood into the legs. The excess heat is then passed into the cooler air. You will see birds stand tall in summer as they extend their legs for greater heat dumping.

If more heat must be lost birds can resort to evaporative cooling. They pant. This increases the flow of air over the moist surfaces of its mouth, tongue, throat and other organs of the respiratory system. This cools the surface, which in turn cools the blood, which in turn cools the body as the blood circulates within the bird. On a very hot summer day observe birds seeking shade under a tree or on your patio. Their bills are open and they are breathing through their mouths.

Some birds hasten evaporative cooling with ***gular fluttering***. They use their throat muscles to flap loose skin at the throat which pumps air in and out. Roadrunners, owls, quail, nighthawks, doves, and many water birds do this.

Breathing, even through the nose, loses water to the air. Some birds (and some other desert animals such as the kangaroo rat) have reduced nasal moisture loss through an interesting method of condensation. As warm, moist air passes from the lungs through cooler nasal passages, condensation occurs within the nasal passages and the bird recaptures this condensation. Cactus Wrens recover up to three-quarters of water that would otherwise pass back into the air.

When temperatures are very hot, water is necessary. Birds, as well as other animals, obtain water by:

-  producing water metabolically by oxidizing food that contains hydrogen (this is a limited source)
-  using the water that already exists in the food they eat (moist plant material, nectar, fruit, animal prey)
-  drinking free water (flying to water sources)

Another water-conservation adaptation that occurs in birds as well as many other desert animals is in their production of waste. They excrete ***uric acid***—a nitrogenous, dry, semi-solid excrement that does not dissolve in water. Unlike the watery urine of most mammals, birds lose little moisture in their wastes. The water that would otherwise be lost during defecation is reabsorbed in the intestines. It appears this is more efficiently accomplished in desert birds.

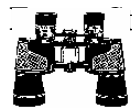


Vultures, as well as some other bird species, practice another interesting cooling “trick”. They defecate on their legs. The moisture contained in the combined urine and feces causes their deep body temperatures to cool to a level lower than they could accomplish by panting. The dried waste material paints the vultures’ legs white. Turkey Vulture legs are really red and Black Vulture legs are gray.

There are other ways birds manage desert life as well. Covered nests, such as that of the Cactus Wren, protect young and adults. Drought, resulting in limited food, alters the time of the breeding season. Young may be produced later or there may be fewer broods in those years.

Deserts can become very cold, too. How do birds adapt to cold? They feed on rich energy foods such as seeds, insects, rodents, fruit, and nectar. This gives them high concentrations of glucose, which increases metabolism and therefore increases body heat. To expose less body surface to the cold, birds stand with one foot tucked in their belly feathers, sit with both feet under them, or tuck their bills into their feathers. Shivering is a temporary measure, which converts muscular energy into heat. Some birds conserve energy by lowering their body temperatures and rate of metabolism on cold nights. They also seek shelter for roosting in protected places. Roadrunners will stand with their backs to the sun and lift their feathers so that their black skin is warmed.

## Activity One – Bird Behavior in Stressful Temperatures



Students research ways in which birds survive the heat and cold of deserts. When summer temperatures soar above 100° or when winter temperatures drop to near freezing, we can observe birds cope with the heat and cold if we know what to look for.

**Procedure:** Using the information supplied in the teacher’s background information, and by doing additional research in books, make a list of observable bird behaviors. Your list may look something like this:

### Heat-related behaviors:

- going into the shade
- flying high in the sky
- remaining quiet
- compressing feathers against the body
- raising or holding wings away from the body
- panting
- gular fluttering
- drinking

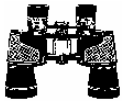
### Cold-related behaviors:

- going into the sun
- fluffing out feathers
- feeding
- tucking feet or bill in feathers
- movement
- shivering
- roosting in a sheltered place
- birds huddle together

With this list students may produce a chart similar to the following example and record temperature-related observations.



## Activity Two – Observing Bird Behavior in Stressful Temperatures



**Focus:** Students carry out a yearlong study of observing bird behaviors in heat and cold.

**Procedure:** Reproduce this chart, or a chart your class devises that may be used to record observations. One chart may be a record of bird observations from the schoolyard; other charts may be sent home with students. Families may become involved in observing bird behavior during summer heat and winter cold.

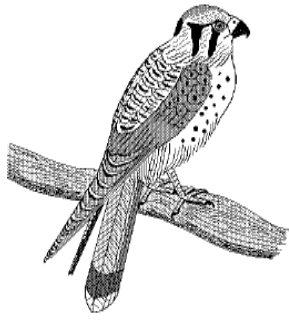
Species	Date	Time	Temperature Weather	Location	Behavior Observed



### Taking Flight

Deserts are homes to fewer species of birds than some other environments. Research the numbers of bird species that are permanent or seasonal residents of the Sonoran Desert and compare that number with the numbers of bird species that are permanent or seasonal residents of other North American regions such as grasslands, woodlands, wetlands, and seashores.





## ***Lesson Six: Urban Raptors***

### **What is a Raptor?**

### **How to Recognize Common Raptors**

### **by Size, Shape, and Flight**

### **Importance of Predators**



#### **Background:**

Cave paintings, feathers incorporated into ceremonial costumes, gold and turquoise figures of owls, hawks, and eagles are evidence that birds of prey have been a feature of art, legends, ceremonies, and stories since prehistoric times. Raptors continue to play a part in many aspects of our culture. We admire their hunting skills, their strong wings, bills, and talons, and their majestic soaring abilities. Perhaps that is why the national symbol of the United States is the Bald Eagle and the symbol of Mexico is the Crested Caracara. Though we may think of raptors as birds of wild places, they also inhabit our cities. It is not unusual to see a Harris's Hawk perched on a tall tree in a backyard, or hear a Great Horned Owl's deep ***hoo-hoo-hoo*** call in the evening—right in the middle of a big city such as Tucson. This section introduces this fascinating group of birds, with emphasis on our urban raptors.

This section is designed to supply the teacher with background information on the subject. The students do their own research as they work on the activities. Research questions are provided with each activity.

The dictionary defines “raptor” as a predator. The word will sound familiar to many children because they will remember the fearsome velociraptor of Jurassic Park. We generally think of predatory birds when we hear the word raptor, but people have different definitions of what a raptor is. Some consider most predaceous birds raptors, but the definition we will use for raptor is ***a bird with a hooked beak, talons, and powerful feet***. This includes the owls, hawks, eagles, and falcons. All raptors catch and kill live animals for food, which is very important in keeping the natural world in balance. By preying on insects, rodents, and rabbits, they keep those populations in check and maintain a healthy balance in the ecosystem. In addition, raptors often prey on weak and sick animals, which helps maintain healthy prey populations.

Tucson is remarkable in the numbers of raptors found in the urban area. Over 300 raptor nests sites have been recorded, representing 11 species. The following raptors are found in and around Tucson. The more common are marked with an \*.

#### **Owls**

Great Horned Owl \*

Western Screech-Owl \*

Barn Owl

Elf Owl

Burrowing Owl

Ferruginous Pygmy-Owl

**Eagles** (they are in the same family as hawks)

Golden Eagle

#### **Falcons**

American Kestrel \*

Peregrine Falcon

Prairie Falcon



**Hawks** (different hawk types in italics)

***Buteos*** (large, soaring birds; long, broad wings; short wide tails)

Red-tailed Hawk \*

Harris's Hawk\*

Swainson's Hawk

***Accipiters*** (small to large birds; long tails; short, rounded wings; flight is a few rapid wingbeats then a glide)

Cooper's Hawk \*

Sharp-shinned Hawk

***Harriers*** (long, narrow wings; long tail; flight is often low to the ground with slow wingbeats and soar with wings held up in a V position)

Northern Harrier \*

Note: Though vultures are not strictly raptors, they will be included in parts of this lesson because they are often misidentified as eagles and hawks. Ravens will also be mentioned.

Large birds soaring and circling high in the sky are common sights, not only over natural desert, but right in urban Tucson, as well. What are these birds? Eagles come to mind for many people, because they are known to be big, soaring birds, but though a Golden Eagle is a possibility, it is not a common sighting. In fact, there are quite a few different species of large soaring birds we see in our skies.

In order to figure this out carefully observe the bird. Look for:

**silhouette** (shape of body, wings, and tail against the sky)

**flight behavior** (soaring, flapping)

**color and pattern** of wings, body, and tail

The large birds you see flying over the desert as well as urban Tucson are probably one of those described below. There are other large birds, so if none of the descriptions below match, look in your bird field guide. Also, immature birds look different than adults. Study the silhouette, flight, color, and patterns. These field marks will help you identify the bird. Since these lessons deal with observation we will only consider the diurnal raptors, and not include owls at this time, even though they are very important birds of prey.

### **Red-tailed Hawk (*Buteo*)**

**silhouette:** broad wings, short tail; wings usually held straight out from body, usually flat and not in a V shape as the vulture

**flight behavior:** soars, flaps occasionally

**color:** light breast; underwings light with black leading edges;

Red-tailed or Harris's Hawk

top side of tail is bright red-brown which can be seen when the bird makes a turn.



Red-tailed or Harris's Hawk



### **Harris's Hawk (*Buteo*)**

**silhouette:** long legs, longer tail than Red-tailed Hawk; perches with a horizontal stance

**flight behavior:** soars on flat wings and glides on bowed wings (a slight downward curve)

**color:** head and body dark brown; chestnut brown on front part of the underwings; tail has a black band which separates the white tail edge and white band near the body; note chestnut shoulder patch and leg feathers on a perched bird; legs and skin around the beak are bright yellow

### **Cooper's Hawk (*Accipiter*)**

**silhouette:** similar to buteos but smaller, wings rounded and angled slightly more forward than buteo, tail is longer than a buteo

**flight behavior:** a series of 3 or more flaps between glides; can dart between trees

**color:** brown above, light below with streaks; bands on tail with a broad white band at the tip

### **Golden Eagle**

**silhouette:** very large; long, broad square-tipped wings

**flight behavior:** soars with wings flat or in a very shallow, upward tilt

**color:** all dark; golden mantle

### **Northern Harrier**

**silhouette:** long, not heavy bodied

**flight behavior:** glides with wings tilted up, slow wingbeats; often seen flying low over grass and brush hunting for rodents

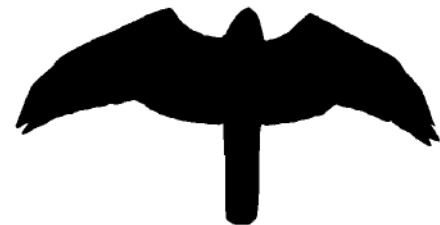
**color:** white patch on base of upper tail; males are silver gray above, white below, and have ink-black wingtips; females are tawny (yellow-brown) above and creamy to light tan below with dark brown streaks

### **American Kestrel (*Falcon*)**

**silhouette:** streamlined with long, pointed wings and tail

**flight behavior:** fly fast, rarely soar

**color:** dark above, barred or streaked below; face has two black mustache marks on each side; males have blue-gray wings, females lack the blue-gray



## Other big, soaring birds:

The Turkey Vulture is generally not considered a raptor because it does not have strong talons and eats carrion (dead animals) rather than hunting prey. They are common and often mistaken for hawks or eagles.

### Turkey Vulture

**silhouette:** long wings; long feathers stick out finger-like from ends of the wings; small head  
**flight behavior:** soars continuously; rarely flaps wings; may swoop low; wings usually held in broad V shape and a slight tilt upward (think V for vulture)  
**color:** mostly black, flight feathers are silvery gray; head of adults is red  
They are seen from early March to mid-October in Arizona, then migrate south to Mexico in winter.



Ravens are common hawk-sized birds and may be confused for raptors, but they are in the perching or songbird category. They often fly in groups of two, three, or more. Listen for their deep *gronking* call.

### Common Raven

**silhouette:** tip of tail is wedge-shaped; large bill  
**flight behavior:** soars hawk-like, but also flaps; sometimes dives and “plays” with other ravens, and occasionally with vultures and hawks  
**color:** solid black; sun may glisten on shiny feathers giving it a momentary bright or white look  
**voice:** often calls with a loud “gronk” in flight



## Activity One – Introduction to the study of raptors



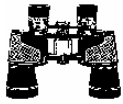
**Focus:** Students define raptors, learn the characteristics, and identify common urban raptors of southern Arizona.

### Procedure:

1. Students research the following questions in reference books or the teacher may hand out information sheets of selected material from the background section of this lesson:
  - What is a raptor?
  - What are the characteristics that make a bird a raptor?
  - Which raptors can be found around Tucson?
2. After students have completed their research, they discuss their findings and list the information on the board. This can be copied into their notebooks.



## Activity Two – Raptor Sizes and Shapes



### Focus:

We know these are big birds as we watch them soar in our skies, but how big are they really? This activity will dramatically illustrate the size of raptors as well as reinforce some of the more subtle differences of body and wing size and shape.

### Raptors

Definition: A predatory bird

Characteristics: A hooked beak, strong feet and talons; catches and kills live animals for food

Common Tucson Raptors: owls, hawks, falcons

### Procedure:

1. List the raptor species you wish to include in this lesson. The more common raptors (and vulture) are:

Great Horned Owl

Harris's Hawk

Western Screech-Owl

Cooper's Hawk

American Kestrel

Northern Harrier

Red-tailed Hawk

Turkey Vulture

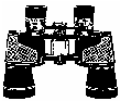
2. Assign a group of students to each species. Students research field guides and other reference books to answer the following questions:

What is the wingspan (measurement from wingtip to wingtip) of the bird?

What is the shape of the wings?

3. After students have researched the wingspans and shapes of the birds, they make life-size cutouts of the different raptors. The silhouette patterns at the end of this lesson or pictures from field guides and other books may be used. Mount the cutouts on a bulletin board, window, or classroom ceiling. Attach name labels to each bird.

## Activity Three – Researching and Charting Common Raptors



**Focus:** Students compare size, shape, color, flight, and voice of each type of raptor. For each raptor being studied, they find the following information:

- Body size and shape
- Color and pattern
- Wing shape
- Tail shape
- Flight pattern
- Voice

### Procedure:

1. Assign a group of students to each raptor (see chart on page 52 at end of this lesson).
2. Make copies of the blank chart on page 54 and give one to each student.
3. Using field guides and other references research the raptors and fill in the chart.
4. Copy this chart onto a large sheet of butcher paper or on the chalkboard.
5. After students have done their research, the information is filled in the appropriate squares—on the large copy posted in the classroom, and on their individual charts, which will be added to students' notebooks.



Comparing body sizes, wing and tail shapes, color patterns, and flight behavior in chart form makes it easier to identify which bird is which. For the teacher's reference, a completed chart is included in this lesson.

**Note: Refer to Lesson Four: Incredible Journeys for a related activity.**

Raptors face many human-caused hazards, especially during migration. Lesson Ten, Activity 2, Page 84, deals with the dangers, both natural and human, that raptors and other birds encounter.



## **Taking Flight**

### **The Importance of Predators**

Predators are often misunderstood. We may admire their hunting abilities and strategies, but we feel empathy towards the cute bunnies, squirrels, and other furry creatures that become food. But what would happen to our environment if predators were removed?



Research the food preferences of each of the raptors being studied. This information may be added to the raptor identification chart. (Common prey items are rabbits, rodents, small birds, reptiles, and insects.)



Research one or more of the prey items to find how many young a female will produce in a year. Assuming half of the young are females, students can figure that each of these females will produce an equal number of young in a year. If half of those are females, they will each produce litters. Draw a pyramid diagram, showing one female at the top and beneath her the explosion of young after a few years. Students will soon see that the land would be overrun by rabbits, squirrels, or grasshoppers after only a few generations of reproduction if it weren't for predators removing many of them. In addition, think about what the prey eat. They consume vegetation. What would happen if there were no predators and all these young prey animals were left to munch on plants?

#### **Here's an example.**

One female desert cottontail rabbit gives birth to an average of three young per litter and has about four litters per year, which equals 12 young. If half are females we now have 6 more rabbits reproducing—and they can begin reproducing at three months of age! Within three months we have the six young plus mom each having a litter of three. That makes 21 young. If half are females we have 10 more reproducing rabbits. Three more months gives us 24 reproducing rabbits. If each has three young we now have 72 rabbits (plus all those males) and this is only the first year! Continue on for a few more years and the rabbit population becomes astronomical.





## Taking Flight

### Raptor Mobile

See Section Three, Page 116, *Fun With Birds*, for a Raptor Mobile creative project.

### Raptor Kites

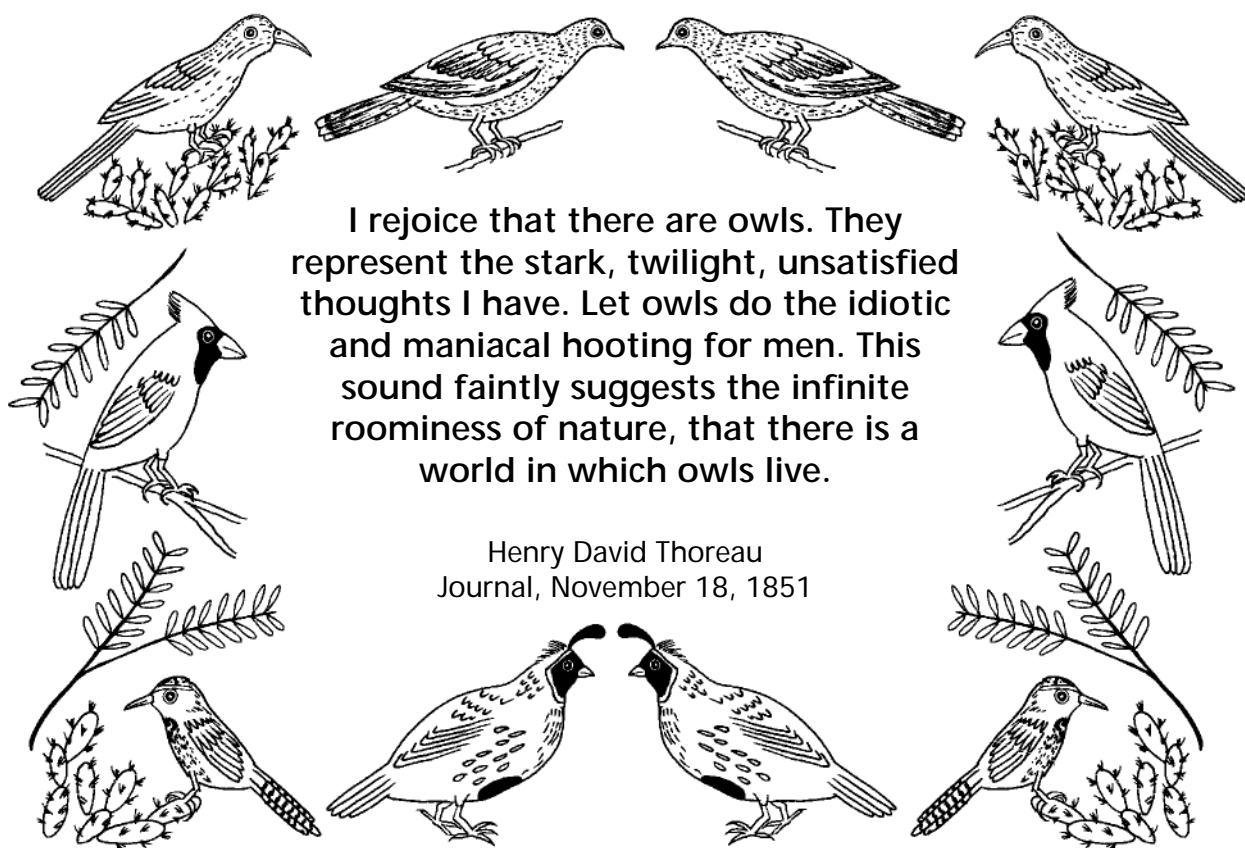
This activity literally “takes flight”. Students construct kites in the shape of a raptor (or the bird may be painted onto a traditional diamond-shaped kite). They may use the silhouette patterns from Activity One, but this time they may wish to paint the bird with realistic colors and markings.

Directions for kite construction can be found in books devoted to kite making, and in science fair project books. Hobby shops sell kite-making materials, and some will give discounts for educators.

#### Cautions:

Never use metal in a kite. It could attract lightning during a storm.

Never fly a kite near utility poles and wires.

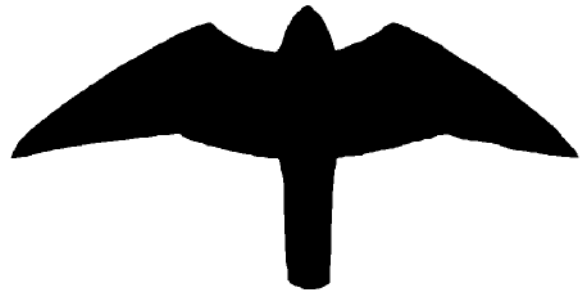


## Silhouettes of Common Urban Raptors and Vulture

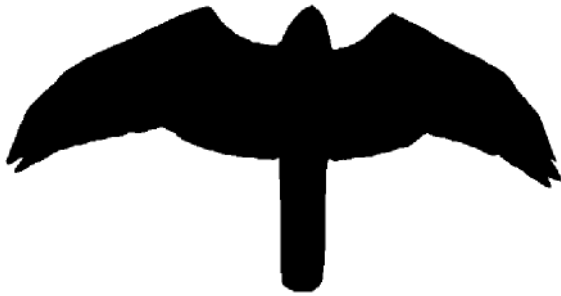
These are not drawn to scale



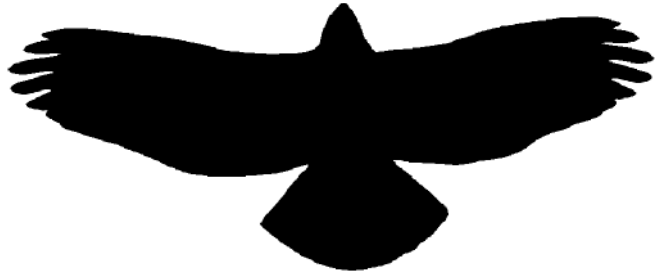
**Cooper's Hawk**



**American Kestrel**



**Northern Harrier**



**Red-tailed Hawk**









**Golden Eagle**



**Turkey Vulture**



## Comparing Five Common Urban Raptors (and Vultures)

	Buteos	Accipiters	Eagles	Harriers	Falcons	Vultures
Species	Red-tailed Hawk Harris's Hawk	Cooper's Hawk Sharp-shinned Hawk	Golden Eagle	Northern Harrier	American Kestrel Peregrine Falcon Prairie Falcon	Turkey Vulture
Body size and shape	medium to large heavy, chunky	short, slim	very large, bill as large as the head	long, lean	small to medium	very large, head is small
Body color	back is dark, often mottled; underside light with streaks, bars or patches	brown above, creamy below, streaked underside eyestripe	mostly dark brown, dark underside, base of tail lighter	males: silver gray above, white below, black wingtips; females: tawny above, buffy below	dark above, barred or streaked below, face has mustache or sideburns	black, legs are red, but appear white from dried fecal material
Wings	broad tips blunt, but sometimes tapered	short, round	long (7 ft. wing-span), broad	narrow, long, pointed or blunt	angular, long, tapered, pointed at tip	6 ft. wing-span; front of underwing is black with gray flight feathers
Tail	short, wide, rounded Red-tailed: rufous Harris's: undertail white at base, white band at tip	long, banded, usually folded in flight	rounded, faint bands	long, not rounded white uppertail coverts	long, not round most have many narrow bands	long, slightly rounded dark
Flight	soars in wide circles for hours; wing beats slow and heavy	series of flaps between glides, fans tail when soaring	glides, soars, wings flat, occasional wing beats	soars or glides low over fields with wings tilted up, wingbeats slow, regular	fast, direct; wings beat continually, but can soar	soars for hours, wings held in shallow V
Voice	drawn out squeal: <b>keeer r r</b> with a downward slur	Cooper: harsh <b>keh keh keh</b> Sharp-shinned: harsh <b>kee kee kee</b>	usually silent, sometimes yelping whistles	usually silent, sometimes a thin whistle	Kestrel: <b>killy killy killy</b> Peregrine: <b>kyah kyah kyah</b>	silent
Silhouette						

Comparing Five Common Urban Raptors (and Vultures)

	Buteos	Accipiters	Eagles	Harriers	Falcons	Vultures
Species	Red-tailed Hawk Harris's Hawk	Cooper's Hawk Sharp-shinned Hawk	Golden Eagle	Northern Harrier	American Kestrel Peregrine Falcon Prairie Falcon	Turkey Vulture
Body size and shape						
Body color						
Wings						
Tail						
Flight						
Voice						
Silhouette						



## ***Lesson Seven: The Cactus Wren***

### **Observing and Researching Arizona's State Bird**

**Background:** Arizona is the only state to adopt the Cactus Wren as its state bird. As students do background research and observe the behaviors of this common resident of the southwest deserts they develop an awareness and appreciation of this state symbol.

The Cactus Wren was officially designated Arizona's State Bird by the State Legislature on March 16, 1931. (The Roadrunner is often mistaken to be our state bird, but New Mexico claims it as its symbol.)

The Cactus Wren is a good choice. It is commonly seen in the open desert as well as in yards in the middle of the city. You may even observe this bird in parking lots picking insects out of car grills, a tribute to its adaptability to urban habitats. The Cactus Wren's fearlessness around humans, its bold streaks and spots, its loud, unmistakable ***cha cha cha*** call, and year-round residency make this one of our more easy-to-identify birds. Perhaps that is why this wren is featured on so many notecards, postcards, and other southwest souvenirs.

Wrens are members of the Troglodytidae family. The word troglodyte is derived from Greek and it means "a creeper into holes" or "cave dweller". All wrens construct enclosed nests they crawl into, thus the family name. The Cactus Wren, *Campylorhynchus brunneicapillus*, is the largest wren in the United States. (See the **Scientific Names** chart in Section Two (pages 99 – 101) for a breakdown of the Genus and species words and their meanings.)

The Cactus Wren is 7 to 8.5 inches long from tip of the bill to tip of the tail. Field marks include a dark reddish-brown cap, a broad white streak above each eye, brown and white streaked back, and spotted breast. Males and females are identically colored and patterned.

Many species of wrens are known for their pleasant songs. The Cactus Wren is not one of them. Its call is a series of grating, throaty, one-pitched ***cha-cha-cha*** syllables that sound like an old car trying to start up on a cold morning. It may not be considered beautiful, but it is a familiar sound to anyone living in the desert southwest and so much a part of the desert symphony.



The Cactus Wren does not migrate. It is a year-round resident of the southwestern deserts. In the United States it is a resident of the Mohave, Sonoran, and Chihuahuan Deserts, ranging across southern California, southern Nevada, southwest Utah, southern and central Arizona, southern New Mexico, and southern and central Texas. Its range continues southward into northern Mexico's desert and dry brushland habitats.

All wrens are great nest-builders. They build a number of nests each year and spend more time and energy in nest construction than most other birds. Cactus Wrens make large, conspicuous nests—football-shape and football-size, with the opening at the narrow, upper end, facing outward. The most common nest sites are in cholla cactuses, in the crotch of a saguaro arm, and within the branches of palo verdes and other thorny trees. They also use man-made structures. The building material is made up of fine materials such as grasses and plant fibers, but Cactus Wrens are opportunists and will also use string, cotton, strips of paper, aluminum foil or plastic wrap, human hair, and anything else they find that they can weave into the nest. Fur and feathers are used to make a soft inner lining.

Unlike many birds, wrens use nests all year—for both reproduction and for roosting. New nests are built in spring and summer for raising young, with a new nest for each brood—usually two per year, but there can be three. New nests are also built for winter roosts. Each wren occupies its own nest. Because nests are so common, easy to see, and often at eye level, one of the following activities deals with Cactus Wren nest observations.

Cactus Wrens feed on a variety of insects, spiders, occasionally lizards, seeds, cactus fruit, plus bird feeder items such as apples and melons.

### Activity One - Create a Cactus Wren Information Bulletin Board



**Focus:** The class dedicates a bulletin board to Arizona's State Bird.

#### **Procedure:**

1. Students draw a large picture of the Cactus Wren. For accuracy an opaque or overhead projector may be used to enlarge a picture from a book. Students take care to draw in and color the illustration as realistically as possible.
2. As the class researches they add illustrated information to the bulletin board such as:



**field marks**, with arrows from field mark notations to the marks on the picture of the wren



**behavior**, with drawings or pictures from magazines of the wren running, perched on a cactus, building a nest, or feeding



**nesting**, with pictures of nests



**habitat and range**, with a range map and picture of typical desert habitat

The board may also include information about when it became the state bird and any other interesting facts and fables they discover in their research. Their observation records may also be added to the board.



## Activity Two –Cactus Wren Nest Study

**Focus:** Students study Cactus Wren nests through observation and measurement. The nests are unmistakable. They are quite large and do not look like the nests of any other species of birds in the area. The nests can be found right in the middle of town as well as in natural desert habitats. Not only are they easy to find, but they are easy to examine because they are often low enough to the ground that we can see them at eye level.

Therefore a Cactus Wren nest study is a good way for students to learn about making scientific observations.

### Materials:

compass  
tape measure or foot ruler  
chart or notebook  
pencil  
binoculars for more distant viewing

### Procedure:

1. Through research, students learn the characteristics of Cactus Wren nests.
2. Before beginning the actual study there are strong cautionary instructions for your students. These are listed below. You may wish to post these for a constant reminder.



*Do not damage the nests.*



*During any close observations and measuring, the nests should never be disturbed – i.e., removed from their site, dismantled, picked at, pulled, or damaged in any way. Do not approach nests during nesting season. Observe only from a distance. It is against the law to harass nesting birds.*



*Do not stress the birds.*



*Observations after nesting season: If a bird flies from the nest as you approach, that means the bird has been disturbed. If this happens move away from the nest and watch for five minutes for the bird to return. If it does not return, move further back until it does return. Approach the nest again to a position where you can see the nest, but not so close as to cause the bird to leave again. Mark this spot so that other observers will know the least disruptive position for added observations. Take measurements at a time when the nest is not occupied by the adult birds and quickly leave the nest area.*

3. The first task, of course, is locating nests. Review the description of a Cactus Wren nest and its likely locations. Look around the schoolyard, along neighborhood streets, and in a nearby park. Students can check their yards and neighborhood for nests.
4. There are a number of nest observations that can be made. This activity may be as simple as writing down where and when a nest was seen and a making a drawing of the nest, or students may take a variety of measurements, make long-term observations, and come up with their own ideas on Cactus Wren nest-building techniques and uses.
5. This sample observation chart on the next page includes many components. You may simplify it, or students may have suggestions for additional measurements and observations.



6. In addition to making the notations listed on the chart, students may wish to make long-term studies of their nests. They could observe the following activities:

If they are able to observe actual nest building they can note:

- length of time for the nest to be built
- were one or two birds actively building the nest
- was the nest completed or abandoned before completion
- nest-building techniques—did they observe the weaving, how did they make the cavity, which materials were used

If they are able to observe parents feeding young they can note:

- how often parents come in to feed
- the type of food they appear to be bringing in
- the calls of the young when the adult approaches the nest
- the appearance of the young at the entrance
- behavior of the adults if other birds get too close

Students may also speculate on the advantage of the cavity nest. How would a nest of this construction be a good one for a desert bird? Possible answers: shade from the sun, protection from wind and rain, air can circulate through the grassy walls, eggs and young are hidden from predators.



## **Taking Flight**

### **State Symbols**

- Learn about Arizona's other state symbols. They will be particularly interested in how some animals became official symbols through the action of school children. Visit [www.dlapr.lib.az.us](http://www.dlapr.lib.az.us) for more information.
- Research the state birds of the other 49 states. Which birds are symbols of more than one state?

### **Other Common Bird Nests**

Many other nests are commonly seen. How can we tell which species of bird made a nest? Just as the Cactus Wren's nest has a distinctive shape, size, and is made of certain materials, other birds' nests have their own unique construction.

Study the nest and note:

- location of the nest (in which plant or structure)
- materials used to build the nest
- the size of the nest
- the shape of the nest
- other interesting features



Two common, easily seen nests of desert birds are those of the Curve-billed Thrasher and the Verdin.

#### Curve-billed Thrasher

Location: in cholla cactus or spiny shrub

Materials: thorny twigs, loosely woven

Size: up to a foot in diameter

Shape: bowl shape

Other: look directly above the nest and notice the spines have been broken off by the adult birds

#### Verdin

Location: within thorny twigs at the end of a branch, also in crotch of cholla or tree branches; commonly found along arroyos

Materials: thorny twigs, densely woven

Size: softball-size, up to eight inches diameter (large for a tiny bird)

Shape: oval ball (with a hollow inside)

Other: opening is near the bottom; about 2000 twigs may be used in one nest

During the spring nesting season never get close to a nest. Other times of year you may get close for a better look at the nest, but leave the nest in place. Some birds reuse nests or recycle the materials. **It is against the law to remove nests of most species of birds.**

The Arizona-Sonora Desert Museum's book, *A Guide to Southern Arizona Bird Nests*, will help to identify other nests you discover.



There is nothing in which the  
birds differ more from man  
than the way in which they  
can build and yet leave a  
landscape as it was before.

Robert Lynd



## Cactus Wren Nest Observations

Observer's Name \_\_\_\_\_

Date of Observation \_\_\_\_\_

Nest # or I.D. \_\_\_\_\_

Location of the site (your yard, park, school grounds, etc.)	
What is the nest built in? (species of plant, other structure)	
Where is the nest in plant or structure? (in center, near edge)	
Are there other nests in the same plant? What kind?	
What are the nest-building materials?	
What is the height from the ground?	
What is the length of nest?	
What is the size of opening? (measure across the center)	
What direction does the opening face? (use a compass)	
What is the condition of the nest? (good, worn, falling apart)	
Does nest appear to be in use?	
Is the wren nearby, is it feeding young in nest, is it calling?	





## ***Lesson Eight – Hummingbirds***

### **Observing Hummingbirds**

### **Hummingbird Flight**

### **Feeding**

#### **Background**

Even people with virtually no knowledge or interest in birds can identify hummingbirds. Their miniature size, incredible flashing colors, and flying abilities fascinate adults and children alike. This lesson focuses on the unique attributes of this group, feeding advice, observation ideas, and hummer projects.

Our smallest birds elicit our grandest superlatives when we describe them. Indeed, almost everything about hummingbirds is amazing. They are the tiniest birds in the world. Their nests and eggs are unbelievably small. Their iridescent flashing colors are more brilliant than any other birds. They are the only birds that can fly backward, upside down, and are able to hover in one place. Colorful birds maneuvering among colorful flowers, poking their bills into one flower after another is a sight not to be forgotten. And the good news is that southern Arizona is one of the best places anywhere to see hummers.

This section is designed to supply the teacher with background information on the subject. The students do their own research as they work on the activities. Research questions are provided with each activity.

There are so many good books available that cover every aspect of hummingbird behavior. Look at the Suggested Reading list (Page 130) in the Appendix for titles. Following is some background information to give you ideas of the topics your students may wish to pursue. Research questions will then lead them to the books for more “gee whiz” findings about these feathered wonders.



#### **Flight-related facts:**

- Wings do all the work for movement. The tiny feet are used for perching, not walking.
- To leave a nest or branch they fly up and away, they don't push off.
- Wings are constructed differently than any other birds. They bend only at the shoulder, and can rotate 180°.
- They can fly forward, backward, upside down, and hover in one place.
- They beat their wings faster than any other birds—up to 80 beats per second.



- They are the only bird with upstroke wing power equal to downstroke power.
- In comparison to other birds they have the largest flight muscles in proportion to body size.
- They have larger breastbones (in comparison to other birds) and eight pairs of ribs (most birds have six pair).
- Relative to body size, they have the largest heart of any other bird or mammal.
- They have the fastest heart rate of any bird.



#### Feeding-related facts:

- They eat more than half of their body weight per day and drink 4 to 8 times their body weight each day.
- The tongue is about twice as long as the bill.
- The tongue is fringed with feathery projections, which bring up nectar via capillary action.
- Their protein supply comes from insects and spiders, which they snatch from the air or take from plants and spider webs.
- Hummingbird flowers are uniquely shaped and suited to hummer bills.



#### Reproductive facts:

- The female builds the nests, tends to the eggs, and feeds the young. The male's only job is mating.
- Spider silk is necessary in nest construction. It binds the plant material and other fibers together.
- Two eggs are the usual clutch.
- The egg is the smallest of all birds—about the size of a pinto bean.

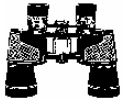


#### Other interesting facts:

- They live only in the Western Hemisphere.
- They get through cold nights by dropping body temperature to approximately the level of the air.



## Activity One – Birds for the Record Books



**Focus:** Hummingbirds are unique in the bird world in many ways. Through research students can make their own *Hummingbird Book of World Records*. As they discover amazing facts they also learn about bird behavior and anatomy.

**Procedure:** Students may come up with their own questions they wish to research, or they may get right to their reading and discover a multitude of interesting hummingbird facts. Here is a sampling of questions they may be thinking about:

### Flight:

- How are the movements of hummingbird wings different than that of any other birds?
- Can any other birds fly backwards or hover in one spot?
- How is the anatomy of hummingbird wings different from other birds?
- How fast can hummingbirds fly?
- How far do some hummingbirds fly during migration?
- How do hummingbird flight muscles differ from other birds?

### Anatomy and Physiology:

- How does the size of the heart compare with other birds?
- How many heartbeats do hummers have at rest? in flight?
- Hummingbirds survive cold nights by becoming torpid. What is this?
- What sounds do hummingbirds make?
- How do the feathers flash those brilliant colors?

### Feeding:

- How much nectar and water must a hummer consume each day?
- How often must they eat?
- What are the colors and shapes of hummingbird flowers?

### Reproduction:

- What is the female's job in raising her babies?
- How large is a nest? What is it made of?
- How large are the eggs?
- How long does it take the eggs to hatch (incubation period)?
- What is the size of the newly hatched babies?

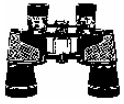
### Range:

- Where in the world do hummingbirds live?
- Which hummingbirds live in Tucson most of the year?
- Which hummingbirds pass through Tucson?

Students discuss their research findings. The information may be entered as a *Hummingbird Book of Records* on a large classroom chart, on a hummingbird bulletin board, and/or on a page in their notebooks.



## Activity Two – How Hummingbirds Fly



**Focus:** No other birds can fly backwards, hover, and maneuver as well as hummingbirds. What is different about their anatomy that allows them to do this?

### Procedure:

1. Students research the following questions:
  - What similarities are there between the wing bones of birds and the arm bones and fingers of humans?
  - How is a hummingbird wing different than that of other birds?
  - What flight movements can they make that other birds cannot?
2. Hold a class discussion about the findings. Students will have learned the following:
  - The bones in a bird wing correspond to the bones in a human upper arm, lower arm, wrist, and fingers. Other birds move all or most of these bones as they fly.
  - Hummingbirds cannot move the lower arm or wrist; their wing movement occurs at the shoulder.
  - But they can do something other birds cannot do.
    - ❖ They can rotate that upper arm bone at the shoulder 180° (making a half circle).
    - ❖ This gives them that unique ability to fly in backwards, hover, and even fly upside down for brief periods.
3. Students may draw pictures of bone structure showing how bird wing bones correspond to human arm and finger bones.
4. Students may draw pictures comparing wing structure of hummingbird wing and other birds.
5. Show students how they can simulate hummingbird wings with their arms with the following demonstration.

Our arms aren't built the same as hummingbird arms. In our demonstration we "cheat" a bit by rotating the two bones in our lower arm. Hummingbirds do all the rotation at the shoulder. But it does give us an idea of the process. Their wings flap so quickly it is almost impossible to see these motions. Study of hummingbird wing anatomy along with high-speed photography has revealed the mysteries of hummer flight.



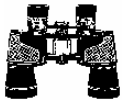
**We can somewhat simulate hummingbird wings with our arms. We will cheat a bit, however, by rotating our lower arm bones as we demonstrate wing beats. Hummingbirds do it all from the shoulder.**

1. First we will flap our arms as a typical bird. Hold your arms out to the sides and bend them at the elbows as you flap.
2. Now we will flap our arms as a hummingbird, moving our arms at the shoulders only. This is how a hummingbird moves forward.
3. Hummingbirds can fly backwards. They do this to back away from a flower after feeding and for other maneuvers. Hold your arms out to your sides, palms forward, and make backward circles with your arms (remember—move them only at the shoulders) pushing against the air. You can almost feel yourself wanting to move backwards.
4. Hummingbirds can hover—remain in one spot in midair—for minutes at a time as they feed from flowers or shower under a water spray. Hold your arms straight out to your sides. Again move only at the shoulder. With palms out, push the air forward. As your arms move forward a ways, turn your palms downward, then backward, this time pushing back. Now forward again. You will notice your hands are making figure eights in the air—eights that are lying on their sides. By pushing against the air forward, then backward, hummingbirds are able to stay in one place in midair. Any students who are swimmers may have used this technique while treading water—pushing the palms forward then backward against the water (making those figure eights), thus staying afloat and in one place.

The pictures at the end of the lesson illustrate the motions of the wings.

### **Activity Three – Hummingbird Flowers**

#### **Part One**



**Focus:** Hummingbirds are attracted to flowers of certain shapes and colors.

**Procedure:** Students research these questions, take notes, and discuss their findings.

- What flower colors attract hummingbirds?
- What flower shapes attract hummingbirds?

#### ***Background information for the teacher:***

Hummingbirds tend to be attracted to colors of longer wavelengths—red, orange, and yellow. The flowers need not have an odor. In fact, red odorless flowers are beneficial to the hummers. Insects are attracted to odors and do not see red well, thus leaving this nectar for the hummers. The typical flower has a long tube. Flowers hang or are horizontal. Flowers are solitary or are at loose clusters at tip of the stalk. Pistils and stamens project from the petals.



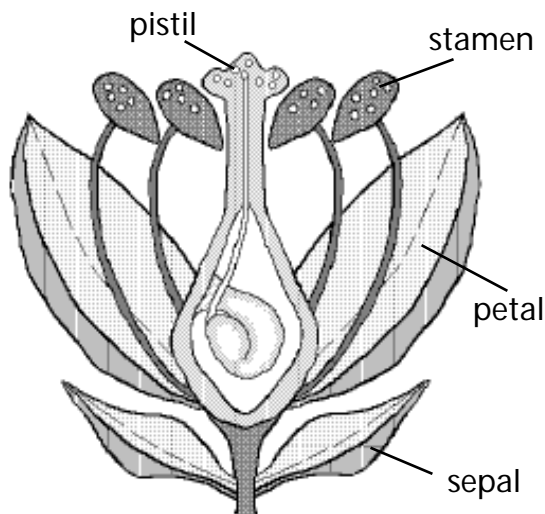
## Part Two

**Focus:** Students learn what food hummingbirds get from flowers and how hummingbirds benefit the flowers.

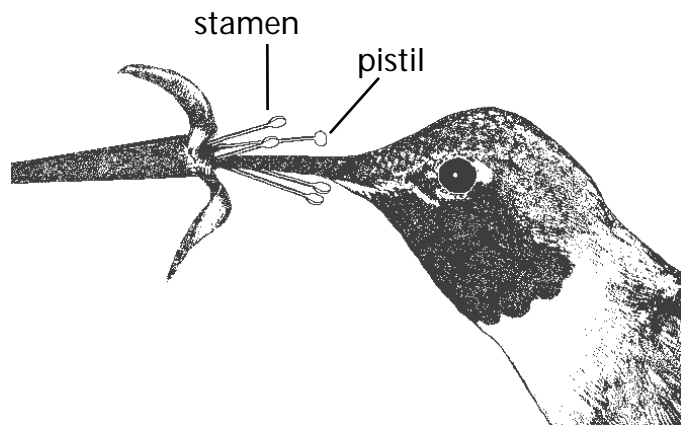
### Procedure:

1. Use a diagram of a typical flower to study the flower parts. A complete flower has these parts:
  - a. Sepals—structures, usually green, that cover the flower bud
  - b. Petals—the structures, often brightly colored, we think of as the flower
  - c. Stamens—the male structures that produce the pollen
  - d. Pistil—the female structure that produces the seeds
2. Discuss the pollination process. Simply stated:
  - a. The pollinator (insect, bird, bat) is attracted to the flower's color or scent.
  - b. The animal feeds on the sweet, liquid nectar at the base of the pistil.
  - c. Pollen grains fall on the pollinator's body.
  - d. The animal flies to another flower of the same species.
  - e. Pollen grains from the first flower fall upon the pistil of the second flower.
  - f. The second flower is then fertilized, which means it will produce seeds.
3. Look at pictures of hummingbird pollinated flowers and notice:
  - a. Flower petals form long tubes, a perfect fit for the hummingbird's long bill and tongue.
  - b. The stamens are usually located in a place where, depending on the structure of the flower, the pollen will easily fall onto the hummer's head or chin or some place on the bill.
  - c. When the hummer visits another flower of the same species, the pollen will rub off onto the pistil, thus fertilizing the flower.

As an art activity, students draw pictures of a hummingbird feeding from flowers, taking care to use the colors and shapes of flowers visited by hummingbirds. They may look in desert flower or garden flower books for examples.



Anatomy of a Typical Flower

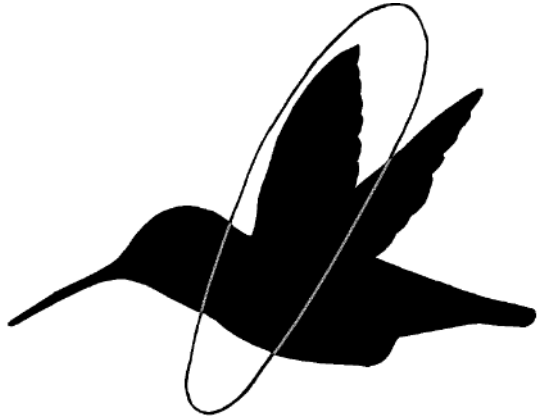


Typical Hummingbird Flower

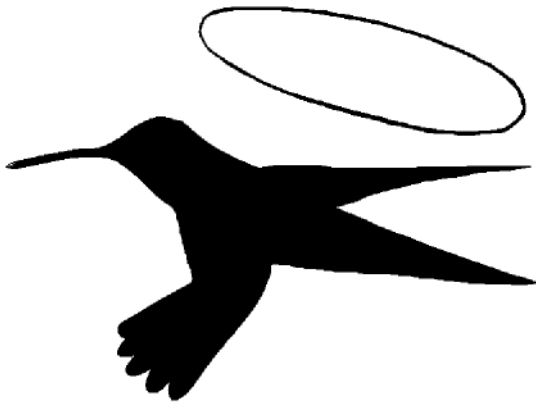


## Hummingbird Flight

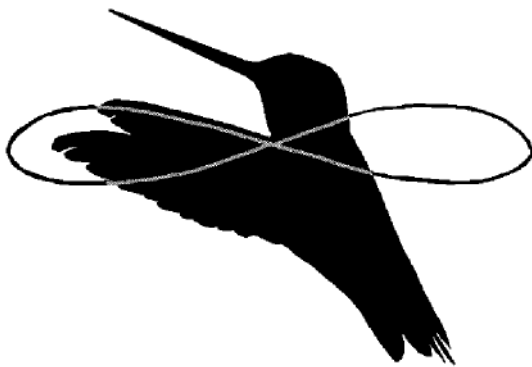
Hummingbirds can fly forwards, backwards, and hover in one place. No other birds can hover or maneuver in air as well as hummers. How do they do this?



To fly forward—the bird makes a circular motion with its wings, scooping the air backwards. This is similar to a swimmer's butterfly stroke.



To fly backward—the bird holds its body in a vertical position, as if it's standing on its tail, and scoops the air forward in a circular motion over its head.



To hover in one place—the bird makes figure 8 strokes with its wings, pushing the air forward, then backward with equal pushes.





## Taking Flight

### Feeding Hummingbirds

Not only are hummingbirds fascinating creatures, but they are easy to attract. Gardens planted with hummer-attractive flowers are the ideal hummer feeders, but commercial or homemade feeders bring in the little birds, too. Hummingbird feeding is a favorite pastime of millions of people. A feeder attached to a window will bring the birds within inches of the observer on the other side of the glass.

Feeding hummingbirds is easy and it doesn't cost much, but it does take time and care. If there is an appropriate site in the schoolyard, a feeder will bring the birds in for wonderful student observation opportunities. Students willing to take on the responsibility of a hummer feeder at home will have fun watching hummer behavior and this may spark an interest in other family members.

In order to insure healthy feeding practices there are a few rules we must follow. They are simple but very, very important. Basic feeding instructions follow, but your class may wish to visit one of the shops in town that specialize in bird feeding. There they can inspect the various styles of feeders and learn the pros and cons of each, plus get advice and tips from the experts at the store.

#### The sugar solution:

- ✓ Use **only** white table sugar and water, no other ingredients.
- ✓ **Never** use honey, brown or raw sugar, syrup, any sweeteners other than white sugar, or red coloring.
- ✓ The mixture should be 4 parts water and 1 part sugar.
- ✓ Bring the sugar water to a rolling boil, reduce heat and simmer for one minute. This assures that the sugar is completely dissolved, retards fermentation, destroys any bacteria in the water, and reduces any chemicals in the water.
- ✓ Cover the pan during boiling and cooling to avoid evaporation, which results in a higher concentration of sugar.
- ✓ Let the solution cool.
- ✓ Store unused solution in a clean container in the refrigerator.

#### The feeder:

- ✓ The feeder should be cleaned with hot water before each filling.
- ✓ If soap is needed, use only a little, and thoroughly rinse the feeder with hot water.
- ✓ Put only enough food in the feeder for a few days. (It will take some time to determine hummer use.)
- ✓ When daily temperatures rise above 95° the feeder should be cleaned and refilled every day or two.
- ✓ Clean the feeder, using a bottle brush, and change the food when the solution is cloudy or has floating particles.
- ✓ For thorough cleaning, use a mixture of one part bleach to 20 parts water and soak feeder for 30 minutes. Rinse three times and air dry.



**Placing the feeder:**

- ✓ Place the feeder in a shady place. The sugar solution will stay fresh longer if it is out of the hot sun.
- ✓ The feeder should be protected from wind. Hummers have an easier time feeding if the feeder is not swinging.

**Add some protein:**

Hummers also need protein in the form of insects and spiders. Bananas, pears, citrus, peaches, or apricots set out near the hummer feeder will attract fruit flies, an important part of the hummingbirds' diet.



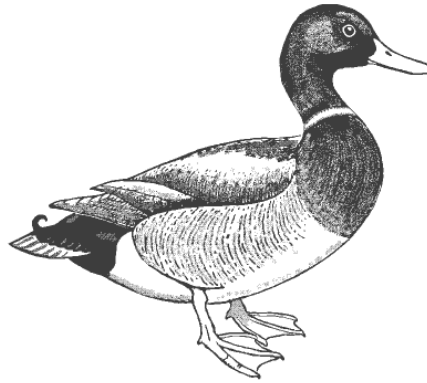
Everything about a  
hummingbird is a  
superlative.

Tom Colazo  
20th Century American Naturalist

## The Quail and the Roadrunner

Looking out of my kitchen window I watched a Gambel's Quail family in the yard. Mom and dad quail, along with their three surviving half-grown chicks, were pecking at seeds. A roadrunner suddenly appeared on the wall, eyed the quail, and jumped down near them. I held my breath to see what would happen next. These situations are always a dilemma for me. I like roadrunners and understand their need to eat, but I had grown fond of the little quail family. Immediately both adult quail took after the roadrunner like a shot—up and over the wall and on the hill beyond. The roadrunner ran along the ground, it hopped over bushes, it flew short distances—with the quail in hot pursuit. This went on for a minute or two. Though it was a serious situation for the birds, it was comical to an observer, reminiscent of the cartoon but with the coyote being replaced by quail. The quail were too much for the roadrunner—it disappeared into the distance and the quail returned to the yard. Oh, oh, where are the chicks? Not to worry. Within seconds the baby quail came out from under a shrub, joined their parents, and went back to pecking seeds.





## ***Lesson Nine -Desert Oases: Wetland Birds in Tucson***

### **Adaptations to a Water Habitat**

#### **Common Species**

#### **Where to Find Them**

#### **Background**

A surprising number of **riparian** or water habitats are situated throughout the Tucson area. These are wonderful places to discover and observe birds adapted to wetlands. Some species can be found year-round. Dozens of species of water birds find ponds during migration. For this lesson only the more commonly seen species are discussed.

This section is designed to supply the teacher with background information on the subject. The students do their own research as they work on the activities. Research questions are provided with each activity.

Birds that spend most of their lives swimming and diving in water are adapted to water life in various ways.



#### **Feathers:**

Down feathers, the soft feathers close to the body, are especially well developed and help to insulate water birds.

Large oil glands keep the feathers oiled and waterproof.

Dense feathers hold in air.



#### **Bills:**

Bill types vary from the wide, flat bill of ducks to the long spear-like bill of herons.

Bills help water birds sieve food from water, scoop up fish and other food, and spear fish.



#### **Feet and legs:**

Webbed or partially webbed feet serve as paddles and swim fins.

Powerful leg muscles help propel birds through the water.



#### **Wings:**

Most diving birds keep their wings folded in the oily flank feathers on each side of the body, which keeps them dry and ready for flight.





**Other:**

Some diving birds have more solid bones than other birds, making them less buoyant.  
Diving birds press down feathers, forcing out air trapped between feathers and skin.  
Diving birds get greater amounts of oxygen from blood and muscles than other birds.

Water birds can be placed in the following very general groups:

**Duck-shaped:**

grebes  
geese  
coots  
ducks

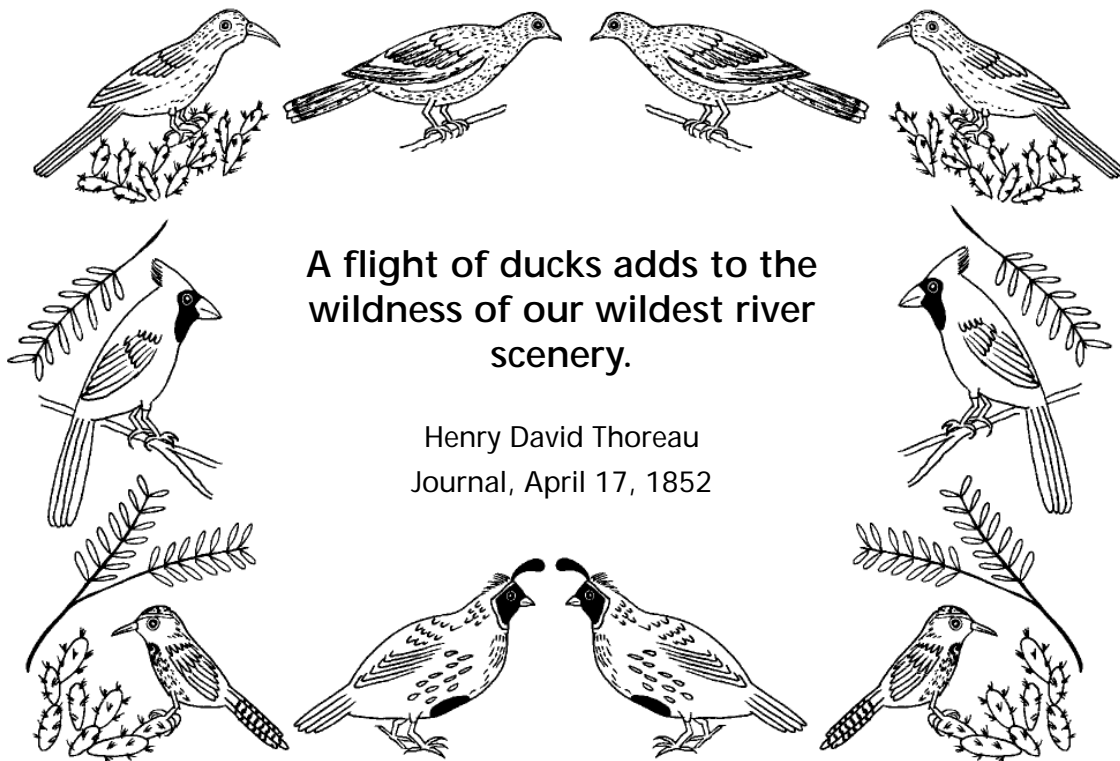
**Long-legged waders:**

herons  
egrets  
ibises







**Smaller waders:**

plovers  
stilts  
sandpipers

The charts on the next pages compare these common water birds.








## Comparing Duck-shaped Birds

Group:	Grebes	Geese	Coots	Dabbling Ducks	Diving Ducks	Stiff-tailed Ducks
<b>Common Species</b>	Pied-billed Grebe, Eared Grebe	Domestic Goose (of mixed heritage), Canada Goose	American Coot	Mallard, No. Pintail, Amer. Wigeon, No. Shoveler, Green-winged Teal, Cinnamon Teal	Canvasback, Ring-necked Duck, Redhead, Goldeneye	Ruddy Duck
<b>Appearance</b>	appear tailless; legs are small and very far back on body	large, heavy body; long neck; short, thick bill	small, black, short tail and wings	most have a bright iridescent patch on the rear edge of the wing	males: dark and light pattern; females: patternless brown	small, chunky; large, flat bill; spiky tail
<b>Swimming style</b>	dive under water	paddle on surface	dive under water	paddle on surface	diving	diving
<b>Wings and flight</b>	rarely seen flying or on land	fly in V formations when migrating	skitter across water on takeoff	fly directly into air from water	need a running start to fly	run on water for takeoff; fast wingbeats
<b>Feet</b>	lobed toes	webbed toes	lobed toes	webbed toes	webbed toes; awkward on land	webbed toes
<b>Feeding</b>	feed mostly underwater; eat a wide variety of water creatures	graze on land; also tips up in shallow water	feed under water and also on shores and grass	feed in shallow water; tip up tail to feed on plants, snails,	feed under water	dive for seeds, roots, insects
<b>Silhouette</b>						



## Comparing Wading Birds

Group:	Long-legged waders			Short-legged waders		
Common Species	Great Blue Heron, Green Heron, Great Egret	White-faced Ibis	Black-necked Stilt, American Avocet	Killdeer (a plover)	Western Sandpiper, Least Sandpiper (small, sparrow-size birds)	Greater Yellowlegs, Spotted Sandpiper (larger and bob head or tail up and down)
Appearance	long neck; spear-like bill; neck erect or back on shoulders	long, thin downward-curved bill; long neck	long, thin legs; thin bill (avocet's is upcurved); small head; short square tail	short, straight bill; short thick neck; round head; long rounded tail; compact	short tails; thin bills; most have brown spotty back and pale undersides; slender, tapered bodies; bill straight or curved	
Behavior and habitat	wade along shorelines; move slowly unless dashing for prey	live and nest in groups; can swim	swim and dive; feed in flocks	may be far from water feeding on grassy areas; can swim	live in flocks; can swim and dive; live at water's edge	
Wings and Flight	in flight the neck is pulled in and folded into an S; legs trail behind long, slender	fly with necks extended; legs trail behind	long, pointed wings; strong fliers	long, tapered wings; erratic flight; call <i>kill deer</i> in flight	pointed wings; rapid flight	
Feet and legs	legs; toes not webbed grab frogs,	long legs; toes partly webbed	long-legged, graceful	run a short distance, then stop	run along water's edge; also wade	
Feeding	fish, mice which they swallow whole	eat insects, worms, snails, crustaceans, frogs, fish	eat small insects, crustaceans	eat insects, worms, crustaceans	eat insects, crustaceans, worms; often probe into mud	
Silhouette						



## Comparing dabblers and divers

Diving ducks: propel themselves underwater with large feet attached to short legs situated far back on the body; have small wings in proportion to body size and fly faster but must be over open water to land because they can't land with precision. They must run along the water surface before they can fly.

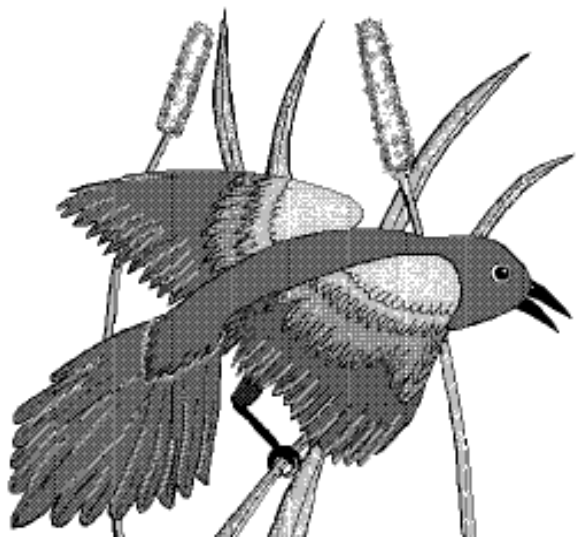
Dabbling ducks: smaller feet on legs situated farther forward; skim food from surface or feed in shallow water by tipping forward, submerging head while tail protrudes upward; have large wings and fly slowly, allowing them to drop down onto small areas.

## Other birds found around water

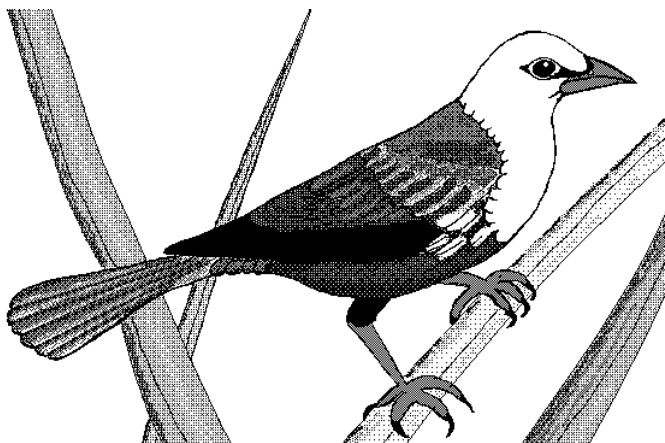
Besides the birds we usually think of as water birds—the swimmers and waders—a number of other birds are also associated with pond and lake habitats. Kingfishers, Red-winged Blackbirds and Yellow-headed Blackbirds are a few of the non-desert species likely to be found at ponds in city parks and wastewater treatment sites.



**Kingfishers** have large, crested heads, big bills, short tails, and small feet. They perch on a branch above water, then plunge head first into the water to catch small fish, frogs, tadpoles, insects, and other aquatic creatures. The common species in southern Arizona is the Belted Kingfisher.



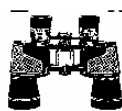
The **Red-winged Blackbird** and **Yellow-headed Blackbird** perch in cattails along the water's edge. The male red-wing has a brilliant red wing patch bordered in yellow. The male yellow-head has a bright yellow-orange head and breast and white wing patches. Insects and seeds make up their diet. They roost in large colonies.



Where can you go to see water birds? This chart lists popular birding spots in Tucson that feature ponds. See Page 127 in the Appendix for the Phoenix area. Park ponds, streams, and water treatment ponds are good places to observe the birds discussed in this lesson.

Site	Location	Birds to look for
Agua Caliente Park	12325 East Roger Road	ducks, coots
Arthur Pack	Thornsdale and Overton	grebes, herons, diving ducks
Christopher Columbus Park	Silverbell north of Grant	kingfishers, herons, ducks, teals, pintails
Fort Lowell Park	Craycroft between Fort Lowell and Glenn	ducks and herons
Kennedy Park	Ajo and Mission	ducks
Lakeside Park	Stella and Pantano	ducks, grebes, herons
Reid Park	Alvernon and Country Club	herons, ducks, kingfisher, variety of cross-bred ducks and geese
Roger Road Wastewater Treatment Plant	across the road from Sweetwater	ducks, herons
Sam Lena Park	Ajo and Country Club	ibis, shoveler, stilt, sandpipers
Santa Cruz at Ina Road Bridge	Ina east of Silverbell	shorebirds and ducks
Snyder Hill Road Sewage Ponds (Avra Valley Wastewater Treatment Plant)	Ajo Way and San Joaquin	shorebirds and waterfowl
Sweetwater Wetlands	Prince and I-10	huge flocks of roosting blackbirds in winter, many ducks, stilts, killdeer, coots, teal

## Activity One – Making a Photo Scrapbook of Water Birds



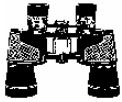
We do not see water birds as often as other urban birds. Also, identifying the ducks, wading birds, and shore birds is more difficult because there are many similarities between them. Therefore a classroom scrapbook is a useful tool for sorting out which bird is which.

### Procedure:

1. Gather old nature and hunting magazines that contain bird pictures. Cut out water bird pictures and sort them according to species.
2. On a piece of 8 1/2 x 11 typing paper or heavier stock, assemble and glue the pictures—one bird species per page. Glue in many pictures of the same species showing different views of the bird, plus male and female differences. At the top of each page write the name of the species.
3. These can be kept in a three-ring binder. As new pictures are found they can be added to the binder. Before a birding trip to a water, habitat students can look through the picture book to review the birds. Take the book along and use it as a field guide.



## Activity Two – Sketching Birds



**Focus:** Water birds make good subjects for sketching because they stay in one place for a longer time than other birds; thus they are easier to observe. As students study the living birds and try to draw them with accuracy they notice details they may otherwise not see. Observing and sketching exercises are helpful for remembering the different species of birds.

### Procedure:

1. Look in books and magazines for artists' renderings of birds. Review drawing techniques in the classroom. Emphasize that the bird is the main subject of the drawing and should be large. Children tend to draw the large scene thus the bird would be tiny and lost in the picture.
2. Take along drawing paper and a good supply of pencils. Allow students plenty of time to observe and make their sketches. Back in the classroom you may wish to continue the art activity. Using their sketches as guides, students can make color renderings with watercolors, colored pencils, or crayons. Discourage felt pens. Colors are limited and blending and shading can be better accomplished with crayon, pencils, and paint.

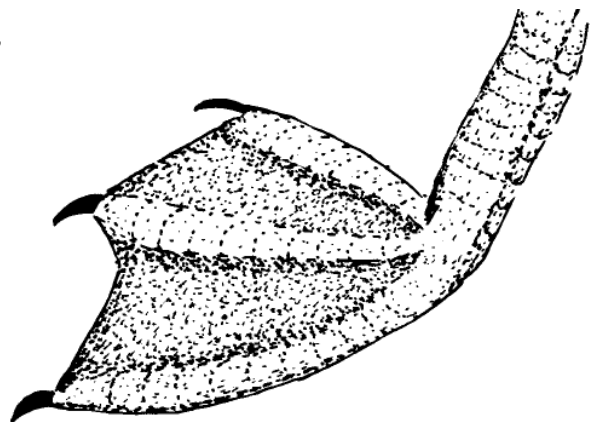
## Activity Three – Adaptations of Water Birds



**Focus:** All birds are adapted to their particular feeding styles and habitats. The various adaptations of water birds—legs, feet, and bills in particular, are especially easy to see, and students can actually watch the birds in action, observing how they use their special tools.

### Procedure:

1. Look at pictures of the birds before the trip to the pond and review the specialized feet, legs, bills, and other features of water birds.
2. As children watch the birds swimming, wading, and feeding at the pond, they see the advantages of the webbed feet of ducks, the set-back legs of diving birds, the long legs of herons, and the uses of the various bill styles. As they observe they will speculate on other adaptations as well.





## Taking Flight

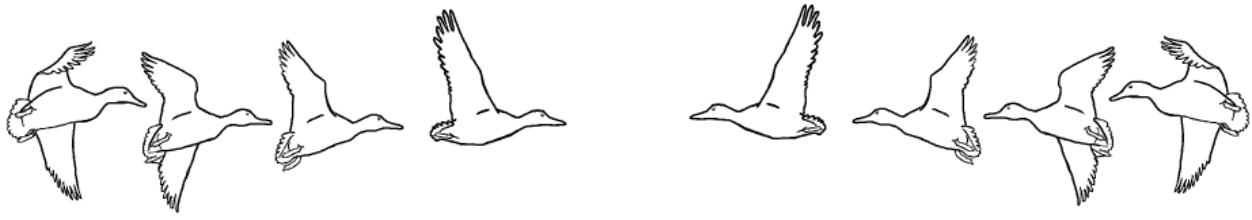
### Junior Duck Stamp Conservation and Design Program

Students from kindergarten through high school are eligible to enter the Junior Duck Stamp Contest. Log onto [www.duckstamps.fws.gov/jrindex.html](http://www.duckstamps.fws.gov/jrindex.html) for information.

#### Noticing specific habitats

Create a classroom mural of a pond showing different species in their particular habitats—on the shore, in the water, perched on a tree, or flying overhead. Students may draw their own scene, or you may use the water habitat drawing in Lesson One.





## ***Lesson Ten: Incredible Journeys***

### **How and Why Birds Migrate Troubles Along the Way Some Southern Arizona Migrants Migration Game**

#### **Background**

Many animals *migrate*—make seasonal movements from one place to another for purposes of feeding and mating. Some travel only a few miles, others journey great distances. Seals, whales, and salmon swim, caribou walk, birds fly. The energy and instincts that come into play with migrating animals intrigue us, but people seem to be especially fascinated with the migration of birds. Perhaps it's the wonder of flight; or the remarkable distances flown by some species; or the stamina of creatures as tiny as hummingbirds traveling over treacherous oceans; or the bafflement of how birds find their way. Or maybe it's the lovely idea of heading south each year for a pleasant winter home.

This section is designed to supply the teacher with background information on the subject. The students do their own research as they work on the activities. Research questions are provided with each activity.

**Why?** We usually think of temperature as the reason birds migrate. Who wouldn't want to get out of the cold for the winter months? But migration is primarily about food. Birds that find food throughout the winter rarely migrate. Think of the cardinals and chickadees in the Christmas card snow scenes. Almost all of the 500 North American species of birds that migrate depend on weather-related food supplies. That means the insect eaters go south to find insects, but many seed-eaters need not migrate because seeds are still available. (Remember those cardinals and chickadees.)

Migration is not triggered by temperature; in fact most migrants leave their northern grounds before cold weather arrives. It is not prompted by hunger either; the birds have been busily eating and fattening up for their journeys. It is the *photoperiod*—the length of daylight—that “tells” them it is time for their fall journey south or their spring journey north. The lessening daylight hours cause *physiological* changes in a bird—changes in the functions and processes of some of their organs. Various biochemicals cause pre-migratory restlessness, additional feeding which adds stored energy in the form of layers of fat under the skin, and other behaviors associated with the oncoming migration.



Temperature may not be an important factor in migration, but weather does play a part. In fall, cool nights cause steady winds to push down from the north prompting migration southward. The opposite is true in spring when birds are ready to head north from their southern winter homes.

**How?** In addition to photoperiods, winds, and physiological changes, there is also the genetic factor. Many species of birds are genetically programmed to migrate. Contained within their DNA—their genetic code—is the ability to pick up cues that prompt them to:

- orient themselves using sun by day and stars by night, and then compensate for changing sky positions (which we cannot do without astronomy books and lots of stargazing)
- sense the earth's magnetic field (which we cannot feel)
- see a band of polarized light at sunrise and sunset (which we cannot see without polarized lenses)
- hear low-frequency sound waves of trade winds and surf (which we cannot hear).

These cues along with the instinctive, genetic urge to go in a certain direction at a certain time allow birds to find their way as they navigate across continents and oceans.

**Why do they return?** As spring months bring longer days the instinct to fly north brings the birds back to their breeding grounds. Even though the weather may not get terribly cold, or food become scarce in their southerly wintering grounds, the birds head north. Look at the map of the Western Hemisphere. Which has more land, North America or South America? The United States and Canada offer huge breeding areas for birds to nest and raise their young and food is plentiful. The birds return, but the spring migration is slower. Fewer miles are traveled each day and stops for rest and food are longer than in fall. Spring brings new plant growth and flowers along with many hatching insects. Birds follow this food supply northward to their summer nesting homes.

**Dangers along the way:** There have always been dangers on the long journeys. The expended energy for long flights, sudden storms that blow birds off course, and extreme cold spells that reduce food supplies all produce life-threatening situations. These stresses plus the flocking of large numbers of birds as they come together to fly, feed, and roost make them susceptible to diseases. Those perils have always been a part of the migration scene, but as civilization spreads and technology advances, the migrating birds face more dangers each year.

The biggest problem is habitat loss. Roads, housing developments, shopping malls, farms, logging, drained wetlands, overgrazed grasslands and other changes to the landscape take away important feeding and resting sites. When large areas of wooded land are removed, only the edges remain. Many predators of birds, such as raccoons, squirrels, and house cats, hang out along the edges of forests. Birds have no choice but to rest in dangerous neighborhoods. Tropical deforestation is having a devastating effect on birds as well as many, many plant and animal species.

But other perils await them as well. Pesticides sprayed on crops to kill insects also kill the birds that feed on them. High-rise buildings, radio towers, and transmission lines kill large numbers of night flying migrating birds that fly into them.

**What's the good news?** The realization that our migratory birds are in trouble is sobering, but there is some good news. People are waking up to the fact that this is indeed a problem for everyone, not just the birdwatchers. It is a reminder that all organisms in nature, humans included, are connected with and dependent upon one another.

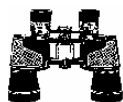


Here are some of the things that are happening. Communities, neighborhoods, schoolyards, and backyards are being turned into habitats for birds and other wildlife as people plant trees, shrubs, and flowers. More people—children as well as adults—are joining conservation organizations, volunteering to help with projects that save wildlife, and writing to government officials to voice concerns about threats to the environment.

### **What about Arizona?**

Many migrant species appear in spring and fall. Some are passing through on their way to their summering or wintering homes. Some stop and spend the winter; others spend the summer. Local birds stay local because they have no need to travel great distances to find food. Gila Woodpeckers, Cactus Wrens, Curve-billed Thrashers, Gambel's Quail, Roadrunners, and of course the city birds such as English Sparrows, European Starlings, and Rock Doves can be found in the neighborhood any day of the year. But there are some species that disappear in the winter months as they fly south to Mexico or beyond. Then there are those species that fly south from more northern climates and spend the winter with us in southern Arizona.

### **Activity One—Tracking Some Southern Arizona Migrants**



**Focus:** Students learn which species of birds do not live in southern Arizona year around.

#### **Materials:**

Field guides  
Maps showing migration routes  
Outline map of North and South America at the end of this section.

**Procedure:** This activity may be done as a class project or individual study, depending upon the ages of the students. Through the use of field guides and other materials, students learn of some species of birds that do not live in southern Arizona year around.

1. The teacher or students choose a few migrant birds (see the charts on following pages for examples) and research their migration routes, and any information about their stay in southern Arizona. Research questions to ask:

Which birds:

- pass through during the spring and fall migration season?
- live here in summer (this is their summer breeding ground) and fly south in winter?
- live here in winter (this is their southern home) and fly to northern breeding grounds in summer?

2. With research and maps, students draw the migration routes of the birds that interest them. They may add interesting migration facts about the birds such as:

- what the summer and winter habitats are like
- how far they fly
- dangers along the way



3. Research information can be shared with the class through reports or maps for a bulletin board. The information may be included in the students' bird study folders.

### Charts of Southern Arizona Migrants

Here is a sampling of migrating species that pass through or spend one season in Tucson.

<b>Birds that pass through in spring and fall</b>		
<b>Species</b>	<b>Spring months</b>	<b>Fall months</b>
Rufous Hummingbird	March – April	mid-July – mid-September
Wilson's Warbler	April – May	August – September
Swainson's Hawk	April	September
Eared Grebe	April – May	mid-September – mid-November

<b>Birds that are summer residents and fly south in winter</b>	
<b>Species</b>	<b>Months in Tucson Area</b>
Turkey Vulture	mid-March – mid-October
White-winged Dove	March – August
Elf Owl	April – July
Lesser Nighthawk	May – mid-October
Black-chinned Hummingbird	April – September
Hooded Oriole	April – September

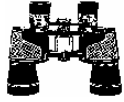
<b>Birds that are winter residents and fly north in summer</b>	
<b>Species</b>	<b>Months in Tucson Area</b>
Northern Harrier	mid-September – April
Sharp-shinned Hawk	mid-September – April
Anna's Hummingbird	mid-August – mid-March
Costa's Hummingbird	February - April
White-crowned Sparrow	October - April





## Activity Two - Migration—Journeys in Jeopardy

A kit containing materials for this activity  
may be checked out at Tucson Audubon Society.



### Focus:

This demonstration illustrates the dangers migrating birds face and how the hazards of migration have increased over the years. A follow-up activity may be a discussion about what people can do to help the birds.

Hawks are used in this activity, but you may adapt the lesson for other species of birds, such as songbirds, hummingbirds, and waterfowl. Each species has certain needs, but for this lesson we use non-specific hawks to demonstrate the general needs and problems faced by migrating birds.

### Procedure:

1. Preparation:  
Color the sticks as outlined in the materials box.

Color key:

Blue represents water.

Green represents trees.

Orange represents food.

Yellow represents weather (storms and wind).

Red represents barriers (mountains, high rise buildings, transmission lines).

Each black dot represents a problem encountered along the route and counts for 100 dead hawks.

Dots on blue sticks mean some water sources are gone.

Dots on green sticks mean some roosting trees are gone.

Dots on orange sticks mean some food sources are gone, or DDT and other insect pesticides used on crops have poisoned food.

Dots on yellow sticks mean bad weather conditions.

Dots on red sticks mean man-made barriers such as skyscrapers, and transmission lines.

**Materials: (This lesson is designed for 3 migration routes. More or fewer may be used by adjusting numbers accordingly.)**

optional: 3 directional compasses

optional: 3 headbands or caps with hawk pictures attached

3 bags each containing 36 popsicle sticks, craft sticks, or tongue depressors colored as follows:

Bag 1 (representing 1900 migration)

9 blue

9 green

9 orange

3 yellow (draw a black dot on two sticks)

6 red

Bag 2 (representing 1950 migration)

9 blue (draw a black dot on 2 sticks)

9 green (draw a black dot on 2 sticks)

9 orange (draw a black dot on 6 sticks)

3 yellow (draw a black dot on 2 sticks)

6 red (draw a black dot on 3 sticks)

Bag 3 (representing this year's migration)

9 blue (draw a black dot on 5 sticks)

9 green (draw a black dot on 5 sticks)

9 orange (draw a black dot on 5 sticks)

3 yellow (draw a black dot on 2 sticks)

6 red (draw a black dot on 5 sticks)

See Activity 4 for optional 4th bag, representing the future.



2. Review with students:

Migration is necessary for many species of birds. They need to travel, often over vast distances, to find food and to reproduce. There is a price to pay for this. Long flight is stressful, weather can cause serious conditions, and human-caused change to the landscape can be disastrous for the travelers.

3. Setting up the activity area:

The activity takes place on the playground—a basketball court is ideal. Determine which court edge lines up best with the north side. Divide the court into four lanes (this can be done lengthwise or widthwise). The northern end represents the summer nesting grounds. The southern end represents the winter-feeding grounds. The lanes represent migration routes.

For the sake of simplicity, we will consider only the migration from north to south. It will not include the months spent wintering in the south, the return trip north, or the problems faced in the nesting grounds. Your class may add to the lesson by including those additional factors of migrating birds' perils and needs.

***Emphasize to the class that this is not a game or a race. This is a simple demonstration of bird migration, illustrating the needs of birds as they make their annual journey from northern to southern homes.***

Copy this scorecard. The recorder enters the number of dots collected by each hawk at the end of the journey. Each dot represents 100 dead hawks.

**Record of Dead Hawks During Migration**

	1900	1950	This Year
Route 1			
Route 2			
Route 3			
Total			



#### 4. Migration activity:

### **Migration Flight One – The Year is 1900**

In **1900** humans have not changed the land very much. The main threats to migrating birds are sudden storms—severe wind and cold along the way.

1. Assign three students to be hawks. Each hawk actually represents 1000 hawks using that migration route. (If you use the optional cap and compass, each wears a hawk cap and each has a compass.)
2. Assign non-hawk students to placing sticks in the lanes. Each lane should get 12 sticks as follows:  
3 blue sticks  
3 green sticks  
3 orange sticks  
1 yellow stick  
2 purple sticks  
Do not be concerned which sticks contain dots.
3. Assign 3 students to be waiting at the southern end of the route, one student per lane. They will collect the sticks from the hawks and report to the recorder the number of dots on the sticks.
4. Assign 1 student to be the recorder and write down the number of dots collected by each hawk.
5. Three migrating hawks line up in a lane at the north end of the area. Each has a compass representing the “internal compass” of migrating birds that instinctively tells them in which direction to go.
6. Call out “Migrate”. At this signal the hawks check their compasses and head south.
7. As they come to the colored sticks they pick them up and carry them to the end of the route.
8. When the hawks arrive at the southern end of their migration journey their sticks are examined by the students waiting for them. The dots per lane are counted. The recorder notes the dots per hawk.
9. Two yellow sticks with dots will be noted. Each dot represents 100 hawks that died because of bad weather along the way.

### **Migration Flight Two – The Year is 1950**

By **1950** many changes have happened. This time as the hawks line up to migrate there are changes in the migration route.

- Farmers spray their crops to kill insects. Pesticides, such as DDT, are now commonly used. Birds, mice and other animals eat the poison-laced plants and insects. The poison passes into the migrating birds as they feed on the plants and animals that carry the poison.
- Some wetlands have been drained to make way for building more and bigger cities. River water has been taken for irrigation.
- Some woodlands have been cut down to make way for farms and cities.
- Tall structures, such as high-rise buildings and transmission towers have appeared.



Repeat the previous activity (steps 1 – 8), but this time use the sticks from the 1950 bag. Assign different students the jobs of hawks, stick placers, counters, and recorder.

At the end of the migration route the dots are again tallied. Each dot represents 100 hawks that died because of storms, fewer lakes and rivers, fewer trees, food poisoned by pesticides, high-rise towers and buildings.

This time the students find:

- 2 yellow sticks with dots (same as 1900)
- 2 blue sticks with dots
- 2 green sticks with dots
- 6 orange sticks with dots
- 3 purple sticks with dots

Students discuss the findings. Why have so many hawks died? What changes occurred along the migration routes?

### **Migration Flight Three – This Year**

Fifty years later the environment has been altered even more. This time the hawks encounter more changes in the migration route.

- Pesticides, such as DDT, have been banned in North America, but are still used in many areas of Latin America. More education is needed for people to understand the dangers of pesticides.
- More wetlands have been drained to make way for even more cities and suburbs.
- More woodlands have been cut down, fragmented, and made smaller to make way for farms, cities and roadways. This means more birds must roost on edges of woodlands, therefore making them more vulnerable to predators.
- More high-rise buildings and transmission towers have appeared. Birds crash into these during night migrations. Also, the lights on high structures disorient birds and throw them off course.
- Many rivers are now only trickles as more water is taken for irrigation, industry, and drinking.

Repeat the previous activity, but this time use the sticks from the This Year's bag. Assign different students the jobs of hawks, stick droppers, counters, and recorder.

At the end of the migration route the dots are again tallied. Each dot represents 100 hawks that died because of storms, fewer lakes and rivers, fewer trees, food poisoned by pesticides, highrise towers and buildings.

This time students find:

- 2 yellow sticks with dots (same as 1900 and 1950)
- 5 blue sticks with dots
- 5 green sticks with dots
- 5 orange sticks with dots
- 5 purple sticks with dots



Again students discuss the findings. Why have fewer died of poisoning? What habitat changes have occurred?

### **Activity 4 – The Future**

After participating in the migration activity students become aware of how quickly the habitats changed because of human activity and how this affects the birds. They will undoubtedly be worried about the future of migratory birds. Explain that many people are concerned about the dangers that human beings have created. It is not too late to fix some of the problems. What are some things that can be done? How can people change the land, making it a better feeding ground and roosting place, and less hazardous to migrant birds?

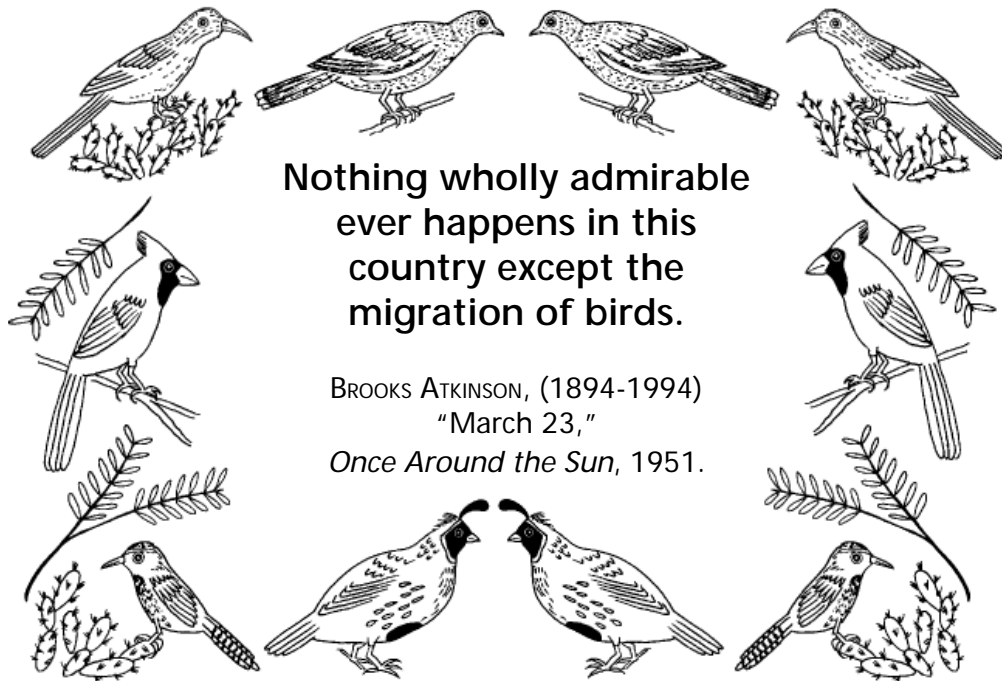
After they have discussed the options for the future, they may repeat the hawk migration with their own numbers of dots on sticks, illustrating the changes we may make—some will benefit migrating birds, others will add to the problems.



### **Taking Flight**

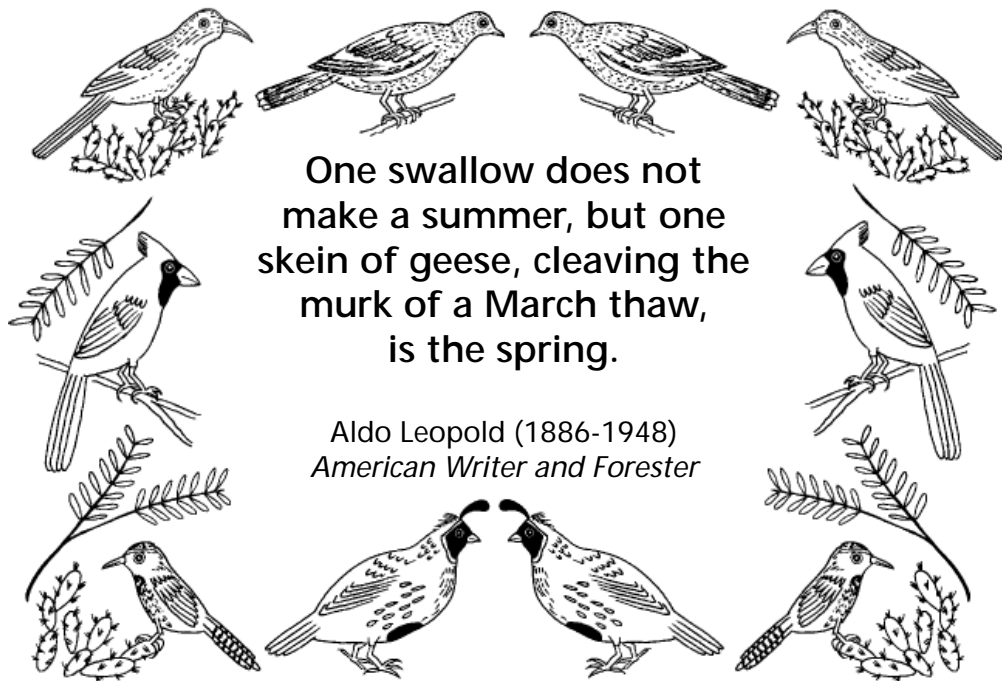
- Check out the Songbird Blues kit from Arizona Game & Fish. See the Appendix, Page 126 (Tucson) and Page 128 (Phoenix) for addresses and phone numbers. The kit concentrates on bird migration and contains lessons, activities and delightful bird puppets.
- Keep an ongoing classroom or school record of observations of birds that migrate through or to Tucson. These observations may be done in the schoolyard, neighborhood, or field trips. Note the species, dates seen, and any other observations. Over the years it will be interesting to look over the records and compare the times of year, and perhaps the arrival and departure times of various species.





Nothing wholly admirable  
ever happens in this  
country except the  
migration of birds.

BROOKS ATKINSON, (1894-1994)  
"March 23,"  
*Once Around the Sun*, 1951.



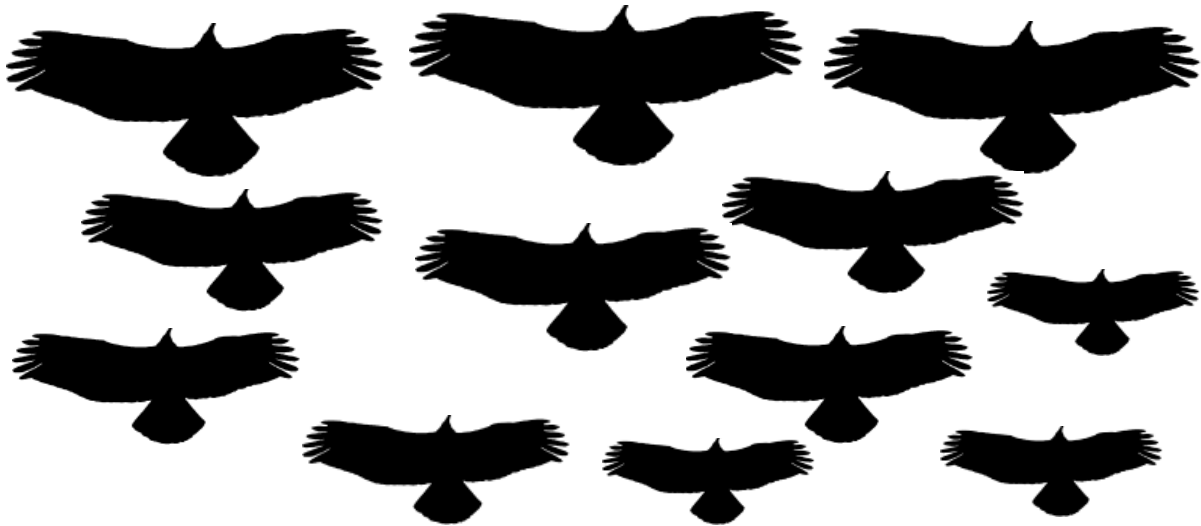
One swallow does not  
make a summer, but one  
skein of geese, cleaving the  
murk of a March thaw,  
is the spring.

Aldo Leopold (1886-1948)  
*American Writer and Forester*



## A Celebration of Vultures

For a number of years I taught in the small elementary school in Big Bend National Park, a large park in west Texas situated in the Chihuahuan Desert. As they are in Arizona, Turkey Vultures are so much a part of the scenery during spring, summer, and early fall that one can be sure to see numbers of the large birds soaring in the blue skies during those months. During the fall one year, my students and I commented on how empty the skies seemed to be after the vultures migrated southward. We missed their presence. On a March day, later that school year, one of my students ran in during lunch break to tell me excitedly, “The vultures are back!” I followed him out to the playground, and there was the first vulture soaring low over the baseball field. Other students gathered around to see what we were talking about and our enthusiasm caught on. From then on, spotting the first vulture of spring became an event for students and teachers alike. Even the parents joined in. Early each March we began scanning the skies. Who would make the first observation this year? We noted the arrival on the calendar and kept an ongoing record. One year the first vulture swooped over the schoolyard in the middle of a tense game during physical education period, but we all stopped in mid-play and cheered our herald of spring. It was our own special celebration. Our skies would again be filled with the graceful soaring forms—a comforting feeling that the cycle continued and all was right with the world.





## ***Section Two – Classroom Research*** **Meaningful and Interesting Research Activities**

Classroom bird units often include research reports. A common procedure is to ask each student to choose a bird then report the research findings to the class. This section includes a method for students to write their reports using an outline. They learn the outline process then put it to practical use.

In addition to the report-on-a-bird assignment, other types of avian research are explored in this section.

<b>Topic</b>	<b>Page</b>
<b>Research a Bird Using an Outline</b>	<b>92</b>
<b>Other Research Topics</b>	<b>95</b>
<b>Scientific Classification System</b>	<b>97</b>
<b>Let's Learn the Meanings of Some Scientific Names</b>	<b>99</b>
<b>How to Capitalize Bird Names</b>	<b>102</b>
<b>Birds in Our Language</b>	<b>103</b>
<b>English-Spanish Vocabulary</b>	<b>108</b>

## Research a Bird Using an Outline

The outline will have more meaning if the students develop it as a class activity. Ask the class what kinds of information they would like to include in their bird reports. As they come up with ideas (color, size, what it eats, where it lives, etc.) jot these on the board. When all thoughts have been noted, look over the list and organize them in categories. For instance, color, field marks, and size would be grouped under *appearance*, whereas nests, eggs, and caring for young would fall under the *life history* category. At the completion of this exercise the teacher can work up an outline similar to Figures 1 and 2. As students work on their reports they use the first outline (see Figure 1) to remind them of information to find. They use the blank outline (see Figure 2) to fill in the pertinent information in an organized fashion.

When it is time for students to present their oral reports to the class they use the outline. This method encourages students to merely glance at the information and use more eye contact with the rest of the class. This is in contrast to reports written in paragraph form, which tends to keep students' eyes on their papers as they read everything word for word.

For a practice run, and to have some fun with this, make up an imaginary bird. Use the outline your students devised or copy the outline in Figure 2. Copy the outline on the board or on a sheet of butcher paper. As the children invent appearance, food, behavior, and the like for the fantasy bird, they can fill in the blanks. This exercise will give them the idea of how to work with an outline and how it will help them remember which facts to include so that their report will be complete.

Later, as students research their birds, the outline will serve as a useful tool. It will keep them on track to include the important information and it will assist them in organizing that information. Insist that each student use ***at least three sources*** while doing their research. This will ensure the reports are more thorough; give them practice organizing information on their outline, and get students in the habit of using more than one resource.

Students may add an illustration to the report. If you have access to an opaque projector students may enlarge their favorite picture of the bird onto a 12 by 18 inch sheet of white construction paper, then copy the outline and markings with pencil. Later, using their resource books or magazine photos as guides, they use crayons to color the bird with the appropriate markings. Do not use colored markers—they are not good for blending colors and color choices are limited. By using the projector, students' illustrations will be quite accurate and a good teaching tool. A few interesting notations about the bird may be made on the drawing as well. After each report the illustration may be tacked to the bulletin board for an attractive and informative display.

Figure 1

**Name of Bird (Common and Scientific)**

- I. Family or order of the bird
- II. Appearance
  - a. Color
  - b. Special field marks
  - c. Size and shape
  - d. Bill, feet, and wings
- III. Range
  - a. Where does it live?
  - b. Does it migrate? If so, where?
- IV. Habitat
  - a. Is it most likely found in deserts, wetlands, urban areas?
  - b. Can it live in a variety of habitats?
- V. Feeding
  - a. What food(s) does it eat?
  - b. How does it find or catch its food?
  - c. What special adaptations help it obtain food?
- VI. Behavior
  - a. Is it usually on the ground or higher up in trees or poles?
  - b. How does it fly? (straight line, up and down pattern, soaring, fluttering, etc.)
  - c. How does it defend itself?
  - d. Describe its call and/or song.
- VII. Life History
  - a. Where does it make its nest?
  - b. Describe the nest.
  - c. How many eggs are laid?
  - d. How long do the eggs incubate?
  - e. Do both parents care for the young?
  - f. How long do birds of this species live?
- VIII. Importance of the species
  - a. How do its feeding habits affect the environment?
  - b. What predators feed on it?
- IX. Other interesting information
- X. Books used for my research

Figure 2

**Name of Bird (Common and Scientific)**

- I. Family or order of the bird \_\_\_\_\_
- II. Appearance
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
  - c. \_\_\_\_\_
  - d. \_\_\_\_\_
- III. Range
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
- IV. Habitat
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
- V. Feeding
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
  - c. \_\_\_\_\_
- VI. Behavior
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
  - c. \_\_\_\_\_
  - d. \_\_\_\_\_
- VII. Life History
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
  - c. \_\_\_\_\_
  - d. \_\_\_\_\_
  - e. \_\_\_\_\_
  - f. \_\_\_\_\_
- VIII. Importance of the species
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
- IX. Other interesting information
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
- X. Books used for my research

## Other Research Topics

There are many things to learn about birds besides information about individual species. Below are a variety of topics you may wish to include in a classroom ornithology unit. These could be incorporated into teaching lessons, projects, or student reports. Choose those that could best be adapted for your teaching situation.

### Characteristics of a bird

- bones
- warm-blooded
- feathers
- two wings, two legs

### What to look for when looking at a bird

- size, shape
- bill, tail, wings
- markings (field marks), color
- call/song, activity (eating, nesting, singing, etc.)
- location of bird (in tree, on ground, etc.), habitat
- season observed

### Topography of a bird

- terms used for external parts of birds to help in identification

### How birds are scientifically grouped

### How birds are built for flight

- bone structure
- wings and wing shapes
- muscles—why they don't tire
- senses used—vision, balance, touch
- types of flight—hovering, long distance flying, soaring

### Feathers

- structure of a feather
- kinds of feathers: contour, down, powder, bristle
- how feathers grow
- numbers of feathers on a bird
- feather muscles
- molting
- preening
- colors: cryptic, attraction
- seasonal changes

### Bones of birds

- structure for flight
- how different from mammals

### Mating

- how we tell males from females
- how the birds tell males from females
- mating behaviors and displays
- declaring territory
- different mating strategies—mating for life, for a season, etc.

### Nests

- types, locations, sizes
- how birds build them
- who builds them (male, female, or both)

### Eggs

- colors, patterns
- sizes, shapes
- structure
- numbers of eggs laid
- how the egg develops
- incubation times
- who sits on the eggs
- birds (cowbirds) that use other nests

### Young birds

- precocial or altricial development
- amount of food eaten
- learning and instinct

### Eating

- bird bill adaptations
- catching/gathering food
- types of food
- use of the crop
- pellets or castings
- eating habits

### Bathing

- water, dust, sun

**Perching**

- why birds don't fall off perch

**Toes**

- how toes are numbered
- different arrangements of toes
- adaptations for feeding, perching

**Ears and hearing****Eyes**

- how different birds see distance, movement, color
- nictitating membrane
- locations of eyes on head

**Bird songs and calls (language of birds)**

- why birds sing
- meanings of the different calls

**Bird bills**

- structure
- adaptations for obtaining food

**Bird feet**

- structure, kinds of toes
- adaptations

**Movement on the ground**

- hopping, running, scratching

**Migration**

- why birds migrate
- how they find their way
- migration routes
- distances flown

**“Bird Book of Records”**

- smallest, largest, fastest, furthest flight
- biggest/smallest eggs

**Local birding**

- which birds are most common in the school neighborhood, nearby park
- make a chart of each bird (silhouette, color picture, song)

**How to go on a birdwalk**

- using binoculars
- how to use a checklist
- bird walk etiquette

**Laws concerning birds**

- collecting nests, feathers
- hunting

**Bird banding****Spanish names of birds****John James Audubon****The National Audubon Society****Birds in fable and legend****State birds and national birds****Threats to birds and what we can do****Attracting birds**

- feeding, watering, sheltering
- dos and don'ts

**Create a backyard or school habitat**

- natural vegetation, water, cover

**Desert adaptations of birds****Life spans of birds****Prehistoric and fossil birds, extinct birds****Birds in folklore****What would happen if all birds disappeared?****Health problems of birds**

- parasites
- disease
- pollution
- insecticides/herbicides
- predators

**Non-native birds: Pros and Cons**

- European Starlings
- House (English) sparrows
- Rock Doves (pigeons)

# ***Scientific Classification System***

## **How we group living things**

As your students study birds they will come upon those strange looking words that tell the scientific grouping of a bird. Many people shy away from these because they look so foreign—in fact they are either Greek or Latin—and many seem unpronounceable. But scientific names are interesting and you and your students know many scientific names already. Even very young children have no problems with *Tyrannosaurus*, *Stegosaur*, or *Triceratops*. Those are scientific names. In the garden we enjoy asters, azaleas, zinnias, anemones, and chrysanthemums. Familiar desert plants are agaves, yuccas, and penstemons. Those are scientific names, too. These words are interesting because, once translated from their Greek or Latin roots, they are often descriptive of the plant or animal or tell where it was first found or who first discovered or named it. You may wish to incorporate scientific nomenclature into language lessons. As students learn the scientific name of the bird they are studying they can research the meanings of the words and how those words are descriptive of the bird. Children enjoy big words and may even learn a scientific name or two as they study birds. The exposure will prepare them for more scientific names in later school years.

The table on the next two pages is a reference for teachers. It gives the genus and species names and meanings for common Tucson area birds.

Following is background information about how and why scientists categorize living things.

The natural world contains an unimaginable number of living organisms. In order to make sense out of such a vast array of plants and animals scientists group them according to their structures, starting with a large, general grouping, then breaking them down to smaller, more closely related groups, until finally coming to an individual species. These are the groups in descending order, from the very broad to the specific.

**Kingdom**  
    **Phylum**  
        **Class**  
            **Order**  
                **Family**  
                    **Genus**  
                        **Species**

This is how human beings are classified:

**Kingdom** – Animalia  
    **Phylum** – Chordata (animals with a special type of nerve cord)  
        **Subphylum** – Vertebrata (animals with a backbone)  
            **Class** – Mammalia (animals with hair; live born; mother provides milk)  
                **Order** – Primates (animals with 5 digit flexible hands and feet)  
                    **Family** – Hominidae (two-legged primates)  
                        **Genus** – *Homo* (human beings)  
                            **Species** – *sapiens* (wise)

This is how one species of bird, the Cactus Wren, is classified:

**Kingdom** – Animalia

**Phylum** – Chordata (animals with a special type of nerve cord)

**Subphylum** – Vertebrata (animals with a backbone)

**Class** – Aves (animals with wings and feathers—birds)

**Order** – Passeriformes (the perching birds)

**Family** – Troglodytidae (the wrens)

**Genus** – *Campylorhynchus* (curved beak)

**Species** – *brunneicapillus* (brown hair)

Notice that the genus and species are always in italics and the species name is not capitalized.

Have fun learning a little Greek and Latin!



*Campylorhynchus brunneicapillus*

a. k. a. Cactus Wren

## Let's Learn the Meanings of Some Scientific Names

The chart on the next two pages gives the scientific names and meanings of the **Genus** and **species** of some common southern Arizona birds. This chart is for the teacher's use. Students will have fun researching the names and their meanings of the birds they are studying. As students report their findings, a similar chart can be developed for the classroom.

**L.** = Latin origin  
**Gr.** = Greek origin

**N.A.** = North America  
**sw** = southwest

**nw** = northwest

### Scientific Names and their Meanings

Common Name	Genus	Species
Cardinal, Northern	<i>Cardinalis</i> L. originally meant important and later a name for a high church official who wore red robes and hat	<i>Cardinalis</i>
Coot, American	<i>Fulica</i> L. fuligo = soot	<i>americana</i> differentiates it from European
Dove, Common Ground	<i>Columbina</i> L. dove or pigeon	<i>passerina</i> L. sparrow-like
Dove, Inca	<i>Columbina</i> L. dove or pigeon	<i>inca</i> misnamed—not native to Peru (home of Incas), but native to Mexico (home of Aztecs)
Dove, Mourning	<i>Zenaida</i> naturalist Charles Bonaparte's wife	<i>macroura</i> Gr. macros = longoura = tail
Dove, Rock	<i>Columba</i> L. dove or pigeon	<i>livia</i> L. bluish for bird's blue-gray color
Dove, White-winged	<i>Zenaida</i> naturalist Charles Bonaparte's wife	<i>asiatica</i> first specimen came from the West Indies and was confused with India
Finch, House	<i>Carpodacus</i> Gr. carpo = fruit; dacos = biting	<i>mexicanus</i> first specimen came from Mexico though they range mostly to the north in the U.S.
Flicker, Northern	<i>Colaptes</i> Gr. kolapto = peck or chisel	<i>auratus</i> L. golden
Gnatcatcher, Black-tailed	<i>Poliophtila</i> Gr. polios = gray; ptilon = feather	<i>melanura</i> Gr. melas = black; oura = tail

Common Name	Genus	Species
Grackle, Great-tailed	<i>Quiscalus</i> L. quail (but not in quail family)	<i>mexicanus</i> common in Mexico
Hawk, Harris's	<i>Parabuteo</i> Gr. para= beside, thus a "kind of hawk"	<i>unicinctus</i> L. uni = once; cinctus = girdled for a single band on the tail
Hawk, Red-tailed	<i>Buteo</i> L. hawk	<i>jamaicensis</i> original specimen came from Jamaica
Hummingbird, Anna's	<i>Calypte</i> not known; perhaps a common name	<i>anna</i> the Duchess of Rivoli; named in her honor by a French naturalist
Hummingbird, Black-chinned	<i>Archilochus</i> Gr. arch = chief; lochos = group of people, thus "first among birds"	<i>alexandri</i> Dr. Alexandre discovered the bird in the Sierra Madres in Mexico
Hummingbird, Costa's	<i>Calypte</i> not known; perhaps a common name	<i>costae</i> named in honor of Marquis de Costa, a French nobleman who collected hummingbirds
Kestrel, American	<i>Falco</i> L. falx = sickle; for shape of bill and talons	<i>sparverius</i> pertaining to a sparrow, though it eats other small birds as well
Mallard	<i>Anas</i> L. duck	<i>platyrhynchos</i> Gr. platus = broad; rhynchos = bill
Mockingbird, Northern	<i>Mimus</i> L. mimic	<i>polyglottos</i> Gr. poly = many; glotta = tongue
Owl, Elf	<i>Micrathene</i> Gr. micros = small; Athene = goddess of wisdom	<i>whitneyi</i> named in honor of Josiah Dwight Whitney, director of Geographical Survey of California
Owl, Great Horned	<i>Bubo</i> L. bubo = hoot	<i>virginianus</i> Virginian, though it ranges throughout North America
Screech-Owl, Western	<i>Otus</i> Gr. otos = ear	<i>kennicotti</i> named for Robert Kennicott, founder of Chicago Academy of Science, who explored nw N.A.

Common Name	Genus	Species
Phainopepla	<i>Phainopepla</i> Gr. phainos = shining; peplos = robe	<i>nitens</i> L. shining
Quail, Gambel's	<i>Callipepla</i> Gr. kallos = beauty; peplos = robe	<i>gambelii</i> named for William Gambel, the first ornithologist to collect and describe birds in California
Raven, Common	<i>Corvus</i> L. crow	<i>corax</i> Gr. krazo = croak
Roadrunner, Greater	<i>Geococcyx</i> Gr. geo = land; kokkux = cuckoo	<i>californianus</i> of California, though ranges throughout sw U.S. and into Mexico
Sparrow, House	<i>Passer</i> L. sparrow	<i>domesticus</i> L. house
Starling, European	<i>Sturnus</i> L. starling	<i>vulgaris</i> L. common
Thrasher, Curve-billed	<i>Toxostoma</i> Gr. toxon = a bow; stoma = mouth, thus bow-mouth or curve-billed	<i>curvirostre</i> L. curvus = curved; rostrum = beak
Verdin	<i>Auriparus</i> L. aurum = gold	<i>flaviceps</i> L. yellow head
Vulture, Turkey	<i>Cathartes</i> Gr. kathartes = a purifier	<i>aura</i> Spanish name for vulture
Woodpecker, Gila	<i>Melanerpes</i> Gr. melas = black; herpes = creeper	<i>uropygialis</i> Gr. ouropygion = rump, the white rump is a field mark
Wren, Cactus	<i>Campylorhynchus</i> Gr. campylos = curved; rhynchos = beak	<i>brunneicapillus</i> L. brunneus = brown; capillus = hair

## How to Capitalize Bird Names

Have you wondered why bird names are often capitalized, but sometimes not? Here are the rules, accepted by ornithologists, for capitalizing common bird names.

If a bird has a non-hyphenated name, all words are capitalized.

Examples: Killdeer, Mallard  
Cactus Wren, Gila Woodpecker  
Great Blue Heron, Great Horned Owl

If a bird has a hyphenated first name, only the first part is capitalized.

Examples: Black-chinned Hummingbird  
White-winged Dove  
Curve-billed Thrasher

A hyphenated middle name works the same way—only the first part is capitalized.

Example: Northern Rough-winged Swallow

If a bird has a hyphenated last name, both parts of the name are capitalized.


Examples: Western Screech-Owl  
Ferruginous Pygmy-Owl

If names are shortened for familiar species, they are written in lower case.


Example: European Starling = starling  
Greater Roadrunner = roadrunner.

When writing about families or groups of birds the names are not capitalized.

Examples: I saw three kinds of doves today.  
Which species of woodpecker made that hole in the saguaro?



*Did you know that  
hawks nest right in the  
middle of Tucson?*



*There's a Red-tailed  
Hawk nest in my  
neighborhood.*

## Birds in Our Language

Our language reflects what is important to us. It also indicates how we view the world around us. Animals and plants figure prominently in our expressions, sayings, and fables—and our language is richer for it. Birds and bird-related words pop up in many everyday metaphors. As you study birds, keep an ongoing list of bird expressions. You will be surprised at the number of examples you collect. Students will know some, and they can ask their families and friends for more. Learning new expressions is fun, educational, adds to our language skills, and may become an ongoing classroom and home project.

Children should be the ones to develop the collection, but the following list is for the teacher's reference. Many of these the children will not know because of references to times past, but you may find some sayings that you wish to pass on to your class which will enrich their language.

### Birds in the Words – Part One

**The answers to these clues contain a word, phrase, or title containing the word *Bird***

- |  |  |
|--|--|
| 1. Panoramic vista seen from a high place:<br>bird's eye view                | 11. Sesame Street character:<br>Big Bird   |
| 2. Maxim that means "go-getters get ahead":<br>The early bird gets the worm. | 12. Sylvester's prey:<br>Tweety Bird   |
| 3. The "facts of life":<br>the birds and the bees                            | 13. Possession doubles the value expression:<br>A bird in the hand is worth two in the bush.   |
| 4. Response to, "How did you find out?":<br>A little bird told me."          | 14. Native American deity or sporty Ford:<br>Thunderbird                                       |
| 5. Hitchcock horror flick:<br>The Birds                                      | 15. Popular Tucson yard shrub:<br>Bird of Paradise   |
| 6. Ridiculous, not to be taken seriously:<br>That's for the birds.           | 16. A wish for joy:<br>May the bluebird of happiness...  |
| 7. Be doubly efficient is to:<br>kill two birds with one stone               | 17. One who is incarcerated is a:<br>jailbird  |
| 8. A ditzy bubblehead is a:<br>birdbrain                                     | 18. People who are alike find each other:<br>Birds of a feather flock together.                |
| 9. First Lady who hated highway billboards:<br>Lady Bird Johnson             | 19. To consume very little food is to:<br>eat like a bird                                      |
| 10. One stroke under par is a:<br>birdie                                     | 20. People from northern states who descend<br>upon Tucson in winter are called:<br>snow birds |

## **Birds in the Words – Part Two**

**The answers to these clues contain a word, phrase, or title containing a kind of bird or something related to birds**

1. A smug appearance:  
looking like the cat that caught the canary
2. Signifying knowledge:  
wise old owl
3. Huey, Dewey, and Louie's uncle:  
Donald Duck
4. Bird who says, "Thath's dithpicable!"  
Daffy Duck
5. Bird who says, "Give a hoot, don't pollute."  
Woodsy Owl
6. Savings for another day:  
nest egg
7. Preparing for hard times:  
feather one's nest
8. To look up and around something to get a better view:  
Crane one's neck
9. A burden one carries:  
An albatross around one's neck
10. Bending down to get beneath an obstacle or to hide:  
duck down
11. A last appearance:  
swan song
12. To repeat someone else is to:  
parrot
13. Someone nervous or jumpy is:  
Goosey
14. Prod or pinch the backside:  
Goose
15. Someone acting ridiculous is a:  
silly goose
16. To spoil one's chances is to:  
cook one's goose
17. With no negative reaction:  
like water off a duck's back
18. Submerge below the water:  
duck under
19. Men's hairdo from the 50's:  
ducktail
20. Delightful (usually used ironically):  
Isn't that just ducky.
21. A stupid person:  
dumb dodo (an extinct bird, said to have become extinct because it didn't try to escape hunters)
22. To cower:  
quail
23. Peace symbol:  
dove
24. Doomed one:  
dead pigeon or dead duck
25. One who rats or squeals is a:  
stool pigeon
26. One afraid to do something is a:  
chicken
27. One who misses the obvious, or "buries his head in the sand" is acting like an:  
ostrich
28. Derogatory term for one who is silly or dumb is a:  
Turkey

29. Going ahead with something even though not prepared is:  
winging it
30. Let's get down to business and:  
talk turkey
31. Those little lines that show up around the eyes are:  
crow's feet
32. Walk with toes pointed inward:  
pigeon toed
33. Walk with toes pointed outward:  
duck toed
34. Being very careful not to upset someone is like:  
walking on eggs
35. When people admit to a mistake they:  
eat crow
36. One who acts exceedingly goofy is:  
crazy as a loon
37. A kind of clock (also refers to someone with mental problems)...  
cuckoo
38. One who is very carefully observing someone or something is:  
watching like a hawk
39. An amusing or eccentric old fellow:  
old coot
40. To grumble about something is to:  
grouse
41. One who is extremely delighted about something is:  
happy as a lark
42. To screech or complain violently:  
Rail (a marsh bird with a harsh cry)
43. A woman who has a beautiful voice sings like a:  
Thrush
44. One who is always talking chatters like a:  
magpie or jay
45. Syndrome suffered by parents whose children have left home:  
empty nest
46. Something not weighing very much is light as a:  
feather
47. To suddenly quit a habit, such as smoking, goes:  
cold turkey
48. One wearing no clothes is naked as a:  
jay bird
49. A big curve in something like a pipe or a river is a:  
goose neck
50. To easily lead someone to do something is like "leading a:  
duck to water"
51. A politician during his/her last term of office is a:  
lame duck
52. Someone who is caught doing something wrong is a:  
dead duck or gone goose
53. Proud as a:  
peacock
54. Someone who is furious is mad as a:  
wet hen
55. A husband who always does what his wife tells him to do is:  
henpecked

56. Someone in trouble who runs away:  
flew the coop
57. Jewish mother's cold remedy:  
chicken soup
58. Someone carefully examining a situation  
looks with an:  
eagle eye
59. One who is organized and wants no  
glitches likes to have his/her:  
ducks in a row
60. After hearing a funny story one may  
exclaim, "What a:  
hoot!"
61. One who thinks the worst is going to  
happen and that "the sky is falling" is a:  
Chicken Little
62. Someone put in charge of people who is  
going to cause problems is like:  
"putting a fox in the hen house"
63. One embarrassed by making a mistake  
has:  
egg on his/her face
64. Line of command:  
pecking order
65. The straightest line between two distances:  
as the crow flies
66. Someone upset by another's admonitions  
has:  
ruffled feathers
67. Old fashioned terms for sweethearts  
kissing and murmuring:  
bill and coo
68. A youngster not very good looking who  
turns out to be beautiful is called an:  
ugly duckling
69. Someone who is a bit strange is an:  
odd duck
70. One who can't get his act together runs  
around like a:  
chicken with its head cut off
71. 2000 Claymation film:  
Chicken Run
72. A bathtub toy or a small raft:  
rubber ducky
73. Poor penmanship, difficult to read is:  
chicken scratch
74. Something not commonly found is rarer  
than:  
hens' teeth
75. Something very simple is easy as:  
duck soup
76. When you warn someone not to spend or  
bet all his money on one thing, you say:  
"Don't put all your eggs in one basket."
77. When one goes off to do something that  
is futile or not going to work out, he is  
on a:  
wild goose chase
78. If someone plans on something before  
accomplishing a goal (like winning a  
lottery), he:  
counts his chickens before they hatch
79. A small, sour berry used in piemaking:  
gooseberry
80. Howard Hughes' huge wooden airplane:  
Spruce Goose
81. Small plants that float on ponds:  
duckweed

82. Walking while in a squatting position:  
duckwalk

83. One in an awkward stage of  
development may be called an:  
ugly duckling

84. One who has accomplished something  
has added a:  
feather in his cap

85. A person who likes to stay up late is a:  
night owl

Birds of myth:  
Roc  
Phoenix

Cars with bird names:  
Falcon (Ford)  
Thunderbird (Ford)  
Lark (Studebaker)  
Roadrunner (Plymouth)  
Skylark (Buick)

Sports teams:

Toronto Bluejays  
Arizona Cardinals  
Baltimore Ravens  
Baltimore Orioles  
Seattle Seahawks  
Atlanta Falcons  
Kansas Jayhawks  
Oregon Ducks  
Philadelphia Eagles  
Atlanta Hawks

Kinds of helicopters and planes:

Osprey  
Harrier

Symbol of "injury lawyers" law firm:  
Eagle

Products:

Ugly Duckling used cars  
Chicken of the Sea tuna  
Goodyear Eagle tires

## English – Spanish Bird Vocabulary

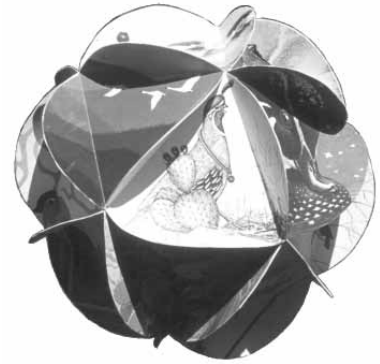
### General Terms

<b>beak, bill</b>	pico
<b>bird</b>	ave, pájaro
<b>bird of prey</b>	ave de rapiña, ave rapáz
<b>crest</b>	copete, cresta
<b>egg</b>	huevo, blanquillo
<b>falcon</b>	halcón
<b>feather</b>	pluma
<b>flight</b>	vuelo
<b>flock of birds</b>	parvada de pájaros
<b>fly (to)</b>	volar
<b>nest</b>	nido
<b>nest cavity</b>	cavidad, hueco
<b>ornithologist</b>	ornitólogo
<b>ornithology</b>	ornitología
<b>soar (to)</b>	remontar, elevarse
<b>talon</b>	garra
<b>wing</b>	ala

### Bird Species

<b>caracara</b>	quelele, quebrant a huesos
<b>cardinal</b>	cardenal, chivo
<b>chickadee</b>	mascarita
<b>cowbird</b>	tordo
<b>crow</b>	cuervo norteño
<b>dove</b>	paloma
<b>dove, common ground</b>	tortolita de milpas
<b>dove, inca</b>	tortolita común
<b>dove, mourning</b>	huilota común, paloma triste, tórtola coluda
<b>dove, white-winged</b>	paloma pitahayaera, paloma de alas blancas
<b>duck</b>	pato
<b>eagle, golden</b>	águila real, águila dorada
<b>falcon</b>	halcón
<b>finch, house</b>	gorrión común, gorrión casero
<b>flycatcher</b>	mosquero copetón, mosquero
<b>gnatcatcher</b>	perlita
<b>gnatcatcher, black-tailed</b>	pisita colinegra, perlita colinegra
<b>grackle, great-tailed</b>	zanate, clarinero, chanate
<b>hawk</b>	gavilán, scipi
<b>hawk, Cooper's</b>	gavilán pollero, gavilán palomero

<b>hawk, Harris's</b>	aguililla cinchada, gavilán de Harris
<b>hawk, red-tailed</b>	gavilán cola roja
<b>hawk, Swainson's</b>	gavilán chapulinero
<b>heron</b>	garzupeta
<b>heron, great blue</b>	garza
<b>hummingbird</b>	chuparrosa, colibrí, chupamirto, chupafior
<b>jay</b>	grajo, pájaro azul
<b>kestrel</b>	halcón cernicalo
<b>killdeer</b>	tildio
<b>kingfisher</b>	martín pescador
<b>kinglet</b>	reyzuelo
<b>mockingbird</b>	cenzontle, chonte
<b>nighthawk</b>	tapacamino, garapena
<b>nuthatch</b>	saltapalo
<b>oriole</b>	calandria
<b>owl</b>	tecolote, buho
<b>owl, barn</b>	lechuza
<b>owl, burrowing</b>	lechuza llanera, mochuelo
<b>owl, elf</b>	tecolote enano
<b>owl, great horned</b>	tecolote cornudo, buho
<b>owl, screech</b>	tecolotito chillón
<b>pelican</b>	pelicano, alcatraz
<b>phainopepla</b>	tohuehui, capulinero negro
<b>pyrrhuloxia</b>	cardenal gris
<b>quail</b>	codorniz
<b>quail, Gambel's</b>	codorniz de Gambel
<b>quail scaled</b>	codorniz escamosa
<b>raven</b>	cuervo común
<b>roadrunner</b>	correcaminos, churea, paisano
<b>sparrow</b>	gorrión, zacatero
<b>starling</b>	estornino
<b>swallow</b>	golondrina
<b>swift</b>	vencejo, golondrina
<b>thrasher, curve-billed</b>	cuitlacoche, güitacochi
<b>thrush</b>	mirlillo
<b>titmouse</b>	copetoncito
<b>towhee</b>	vieja, viejita, ilama
<b>verdin</b>	verdín
<b>vireo</b>	vireo
<b>vulture</b>	zopilote, buitre
<b>vulture, black</b>	zopilote común
<b>vulture, turkey</b>	aura común
<b>warbler</b>	gusanero, chipe
<b>woodpecker</b>	pájaro carpintero, picapalo
<b>woodpecker, Gila</b>	carpintero de Gila
<b>wren</b>	saltapared, matraca
<b>wren, cactus</b>	matraca grande, saltapared



### ***Section Three - Fun With Birds*** **Creative Projects for the Classroom**

Students have learned about birds through various studies and observations. Now it's time to bring out the crayons, paints, scissors, and glue. In this section are ideas for creative projects related to birds. Some of the activities are related to and enhance the lessons, and others are just for fun.

<b>Activity</b>	<b>Page</b>
<b>Silhouettes Against An Arizona Sunrise (or Sunset)</b>	<b>110</b>
<b>Birdy Gourds</b>	<b>111</b>
<b>Geodesic Balls</b>	<b>112</b>
<b>Bird Talk Bulletin Board</b>	<b>114</b>
<b>Let's Create a Habitat</b>	<b>115</b>
<b>Raptor Mobile or Center Piece</b>	<b>116</b>
<b>Three Dimensional Bird Scene</b>	<b>117</b>
<b>A Photo Scrapbook for the Classroom</b>	<b>118</b>

## ***Silhouettes Against an Arizona Sunrise (or Sunset)***

**This art lesson reinforces bird silhouettes as students have fun playing with wet paint on wet paper.**

### **Part One**

1. Discuss the colors that appear in the sky at sunrise and sunset and, if available, look at photographs in magazines such as *Arizona Highways*.
2. Add water to the sunny colors (reds, yellows, oranges) in the water color tray.
3. Wet the paper with a wide brush.
4. Dip a brush into a color and draw it across the wet paper. The color should feather out.
5. Draw another color across the paper and allow it to run as well. It may blend with the previous color. Tilting the paper will produce interesting effects as the colors intertwine.
6. Do this a few times until there is a pleasing pattern that resembles the sky at sunrise or sunset.
7. Allow students to experiment with a number of sky paintings. Set them aside to dry.

#### **Materials:**

white construction paper  
water color paints  
brushes  
water cup  
black felt pen (optional)  
photographs of sunsets (optional)  
bird books

Note: Students tend to overdo the colors and scrub with the brush, which results in a muddy brown. Take care not to overdo the colors or the brushwork.

### **Part Two**

1. On the sky painting, paint or sketch a few desert plants with colored pencils.
2. Students examine pictures of desert birds they wish to include in their pictures.
3. On separate sheets of paper they draw the outlines of these birds and color them black to resemble silhouettes.
4. They may then add these to the sky picture. They can redraw them on the painting, then paint the silhouette with black paint or black felt marker. Or they may cut out the silhouettes and glue them on the painting. The birds can be perched on the plants, or flying against the colorful sky background.
5. Take care to make the bird the appropriate size in reference to other birds, the background, and the distance.

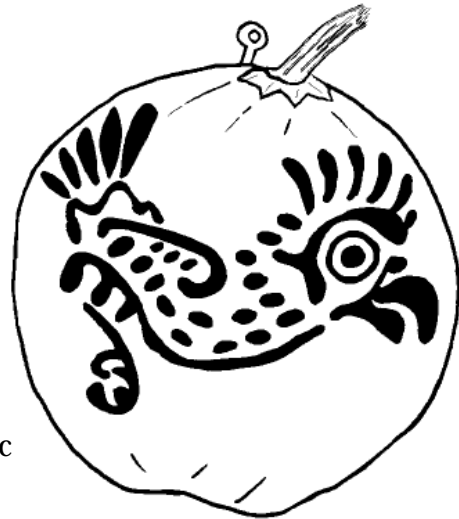


## ***Birdy Gourds***

### **Create Ornaments with Prehistoric Bird Designs**

#### **Materials:**

gourds  
acrylic paint (tan, yellow)  
paint brushes  
water  
pencils  
black felt-tipped pens  
small drill  
small eye screws  
ornament hangers  
varnish (or clear spray acrylic)  
varnish remover



Aztec

Children create ornaments from wild gourds by decorating them with designs. Any designs may be used, but prehistoric animal designs are not difficult and very attractive. Mimbres and Aztec bird designs are especially charming. Look in your library or bookstore for books containing North American prehistoric Indian designs. Students may copy designs or create their own.

1. Collect gourds throughout the late summer, fall, and winter months. Gourds are commonly found along southern Arizona roadsides and farm fields. There are two local species, *Cucurbita digita* (it has finger-like leaves) and *Cucurbita foetidissima* (it has large triangular leaves). Common names are coyote melon and buffalo gourd. Both are yellow and tennis ball size.

2. Collect more gourds than needed because some will shrivel and some will rot. Place the gourds on sunny window sills to dry. This will take a few months. If you wish, keep a short piece of stem attached. Do not set the gourds outside to dry because the woodpeckers will quickly destroy them.

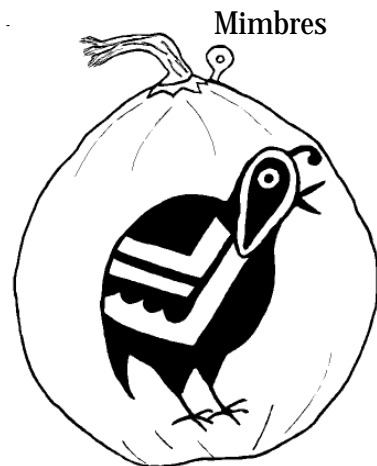
3. Drill a small hole in the top next to the hard stem. Insert a small eye screw in the hole. Add a little glue to be sure the screw is firmly attached.

4. Holding the gourd by the eye screw, paint the entire gourd a light color. A tan or yellow gives it a natural look. Place an ornament hook in the eye screw and hang the gourd on a string to dry.

5. Select a design from a reference book, or create a design, and draw a light pencil sketch onto the gourd.

6. Color in the design with a permanent black felt-tipped pen.

7. To give the gourd a shiny, finished look and to preserve the artwork, coat the ornament with varnish or spray on a clear acrylic.



Mimbres

## ***Geodesic Balls***

### **Combine Geometry and Old Christmas Cards for a Cool Decoration**

Birds are popular subjects for Christmas and other greeting cards. Snow scenes depict cardinals and chickadees. Desert scenes abound with roadrunners and quail. Save those old cards for a project that combines geometry, art, and a little manual dexterity. If you do not have cards, or not enough for a complete ball, then construction paper and bird pictures will work.

#### **Materials:**

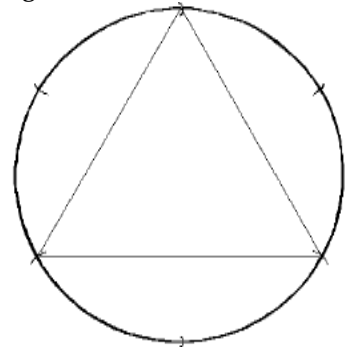
drawing compass  
ruler  
pencil  
greeting cards with bird pictures or construction paper of various colors  
circle and triangle patterns (instructions below)  
tagboard or other sturdy material for the circle and triangle patterns  
scissors  
glue  
paper punch  
string



#### **Making the Patterns**

1. Decide on the size of your circle. A three or four inch diameter works well and will accommodate most greeting cards.
2. Use tag board or similar sturdy material for the circle and triangle patterns.
3. Use the drawing compass set for the desired radius (half the size of the circle you want) and draw two circles on the tag board.
4. Do not change the radius of the compass. Set the point of the compass on the circumference line of one of the circles and draw a mark where the pencil touches the line.
5. Set the point of the compass at the intersection of your pencil mark and the circumference and draw another mark on the line.
6. Continue this process until you have made 6 marks. If you have been careful, all will be equidistant from one another.
7. Use the ruler to draw a triangle connecting every other mark. This will give you an equilateral triangle that fits perfectly inside the circle. See Figure 1.
8. Cut out the circle and the triangle for the two patterns.

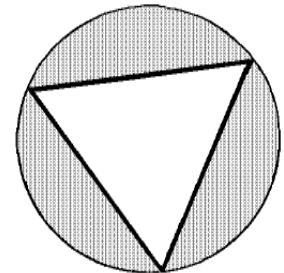
Figure 1



#### **Making the Geodesic Ball**

1. Use the circle pattern to trace 20 circles on your cards or construction paper.
2. Cut out the circles.
3. Set the triangle on a circle and carefully fold the 3 circle edges (shaded in the Figure 2) over the triangle. Do this with all 20 circles.

Figure 2



4. Take 5 of the creased circles and place them point to point and glue the bent up edges together to make a “cap” (it looks like a beanie cap). Pinch the glued edges together with your fingers for a moment for the glue to set. The shaded parts of Figure 3 show the glued edges.
5. Take another 5 circles and make a second “beanie cap”. The two caps will form the top and bottom of the ball.
6. Take the remaining 10 circles and place them together as pictured below—alternating the triangle points as you make the row. It should look like Figure 4.

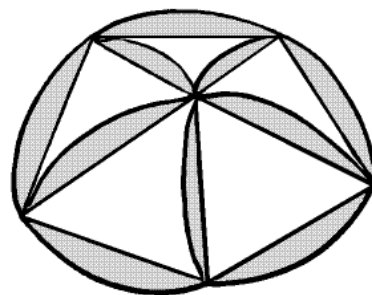


Figure 3

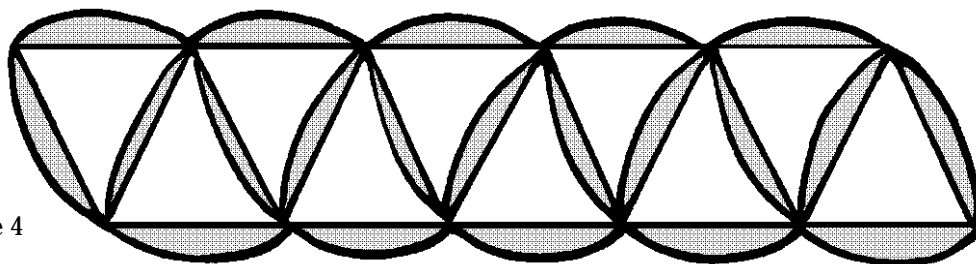


Figure 4

7. Make a “bracelet” of this strip and glue the last two edges together. This will form the center of the ball. See Figure 5.
8. Glue one “beanie cap” onto the top of the “bracelet” and let the glue set.
9. Glue the second “beanie cap” onto the bottom of the “bracelet”. Now you have a geodesic ball. See Figure 6.

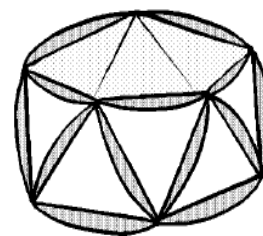


Figure 5

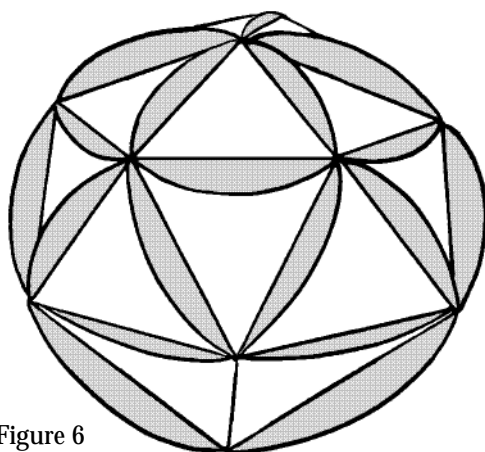


Figure 6

### Finishing Touches

1. Use scissors to trim any rough or uneven edges from the glued together sections.
2. If construction paper was used, glue bird pictures on the triangle parts of the ball.
3. Option: glitter the edges for accents.
4. Punch a hole in one of the glued edges and hang from a string.

***See the photo of a geodesic ball on the first page of the directions and on the cover of Section Three.***

### What does *geodesic* mean?

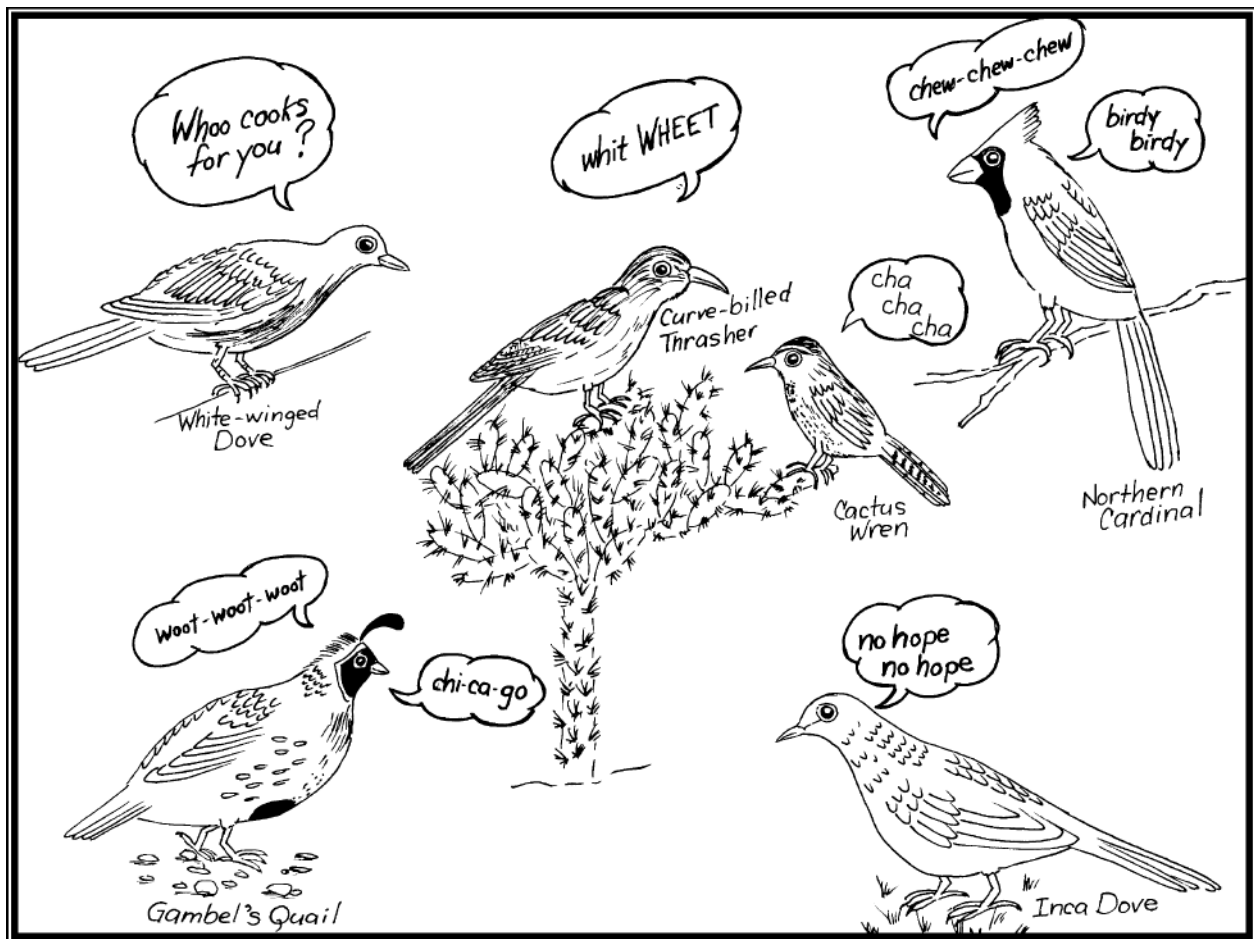
The prefix *geo* refers to the earth, and often to a curved surface. The definition of geodesic is: designating the shortest surface line between two points on a surface, especially a curved surface. A geodesic dome is a curved structure made of short, straight bars that form a dome of polygons, often triangles. Look at a soccer ball to see the kinds of polygons that make up the ball.

## Bird Talk Bulletin Board

Listen carefully to the birds as they call and sing. Some seem to be saying words; some remind us of other sounds. Different people will have their individual interpretations of what the birds are saying. It's fun to try to figure out the sounds, plus the exercise is an aid in remembering the call.

Take the bird talk exercise and combine it with an art activity to help children associate the call with the bird.

As students listen to birds, they write down their interpretations of what the birds are “saying”. They draw a picture of the bird and enclose the “words” or sounds in cartoon-like balloons. Arrange the pictures and corresponding “words” on a bulletin board. The students will have fun noting how different children perceive the sounds, and they can practice the calls. Soon they will be able to identify the common neighborhood birds by sound alone—a skill experienced birders use as they look for birds.



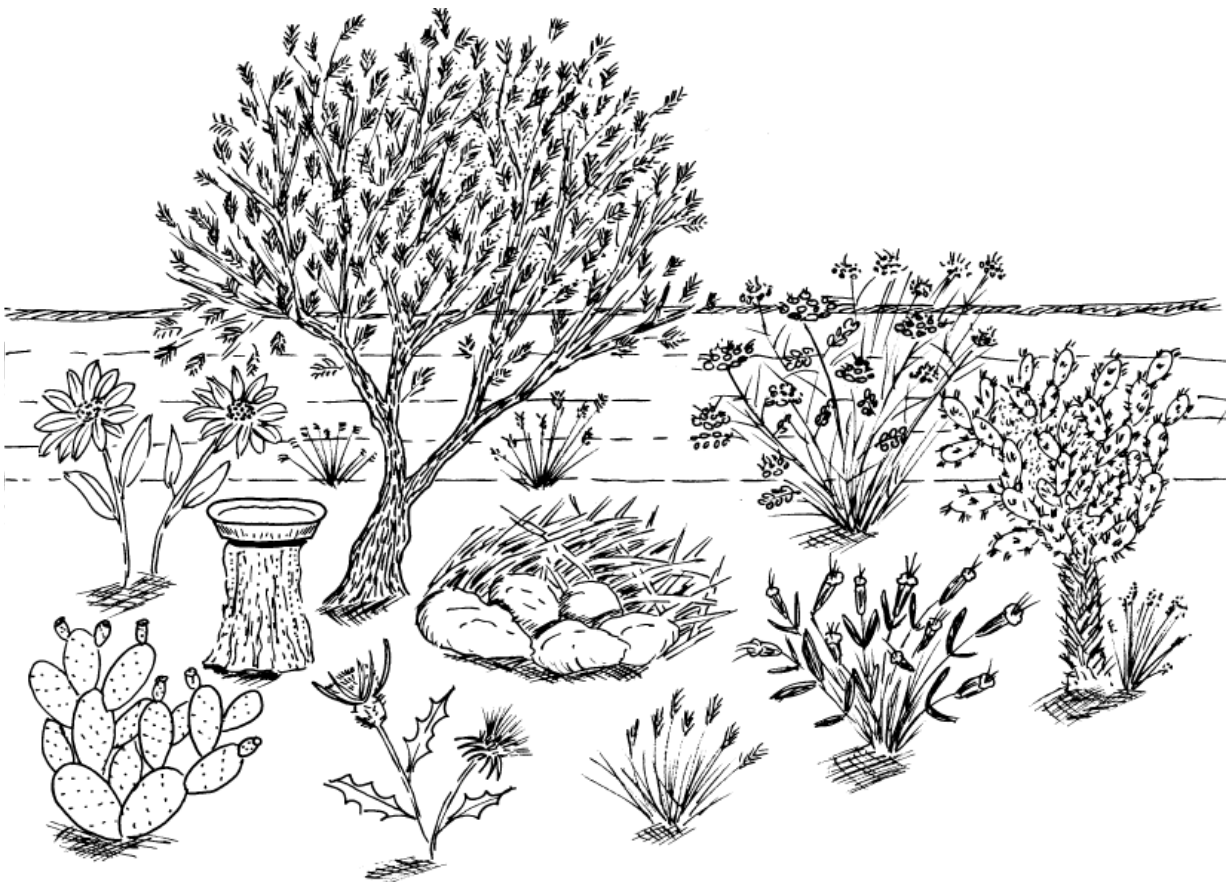
## Let's Create a Habitat

Create a schoolyard or backyard habitat for birds on a mural. After students have learned the needs of urban birds—plants that provide various types of food such as fruit, seeds, and nectar, places to perch, places to hide, nesting spots, and other components that supply food, water, and shelter, they can design a habitat that suits the needs of birds they wish to attract.

Students make a list of the birds they wish to attract to the site. Take care not to make the list too long, or the habitat will become too complex. Then they list each bird's habitat needs. Students may work in teams, each team concentrating on the needs of one species, or they may make a general mural including various types of flowers, perching plants, water sources, and hiding places that would attract a variety of birds. Use a long sheet of butcher paper and crayons for the mural.

After the students have completed the mural, they may be so enthused about the project they will plan a real-life habitat in the schoolyard or in their own backyards. (The Arizona Game and Fish Department provides annual grants for such projects. Visit our website: [www.azgfd.com](http://www.azgfd.com) for more information.)

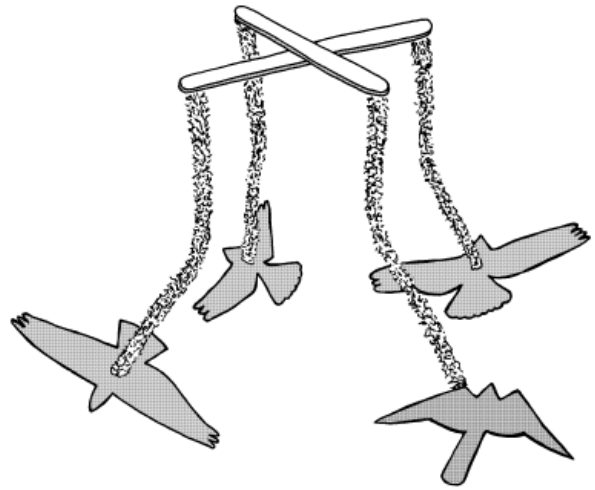
### A Habitat for Urban Birds



## Raptor Mobile or Center Piece

Here's how to make an attractive mobile or centerpiece while learning comparative sizes of common raptors. The raptor silhouettes on this page are to scale. One foot = one inch.

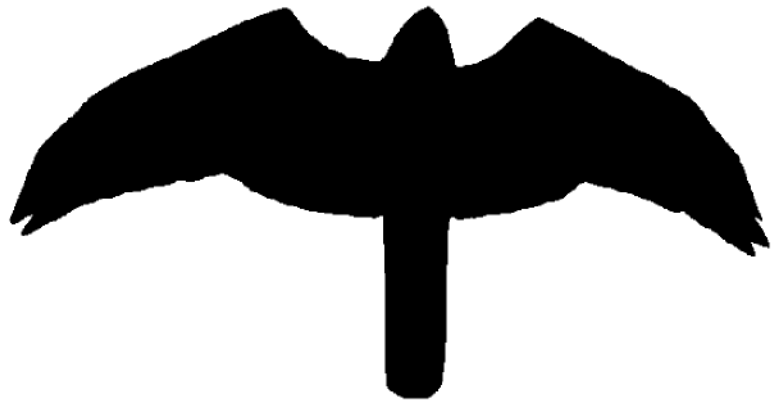
1. Copy the silhouettes on a copy machine. Enlarge them if you wish, but place all four together so that the scale remains the same.
2. Cut out the silhouettes and trace them on stiff paper.
3. Cross two Popsicle sticks, then glue or tie them together to make a cross.
3. Make a small bend in each end of four pipe cleaners.
4. Glue one bent end of a pipe cleaner to the end of a stick.
5. Glue the other end to a bird.
6. Do this with all four birds.



When you are finished you can hang the mobile from the ceiling, or, for a table decoration, turn it upside down so the cross sticks become the base.



Cooper's Hawk



Northern Harrier



American Kestrel



Harris's Hawk

Raptor silhouettes are to scale. One inch = one foot.

## Three Dimensional Bird Scene

Build a three-dimensional hummingbird scene in a clear plastic food container by creating a background, middle ground, and foreground. The foreground is glued to the inside front of the container. The middle scene is suspended at the center, and the background is glued to the inside back.

### Materials:

clear plastic snap-shut food container  
(used for sandwiches, salads, pastries, etc.)  
art supplies (drawing paper, paints, colored pencils, etc.) OR  
pictures cut from magazines  
scissors  
glue  
paper punch  
string  
optional: nail, pliers, candle (see # 9)



1. Research the hummingbird to learn its colors, the flowers it feeds upon, and any other interesting facts that would help you create a realistic scene.
2. The 3-dimensional artwork will have a background, a middle ground, and a foreground.
3. The three parts of the scene may be painted or drawn, or cut from nature magazines.
4. Create the background and glue it onto the inside back of the container, with the scene visible through the front of the container.
5. Create the middle ground scene (the hummingbird) and, with a string, hang it from the top of the container so it “flies” in the middle of your scene and is visible through the front of the container.
6. Create the foreground and glue to the inside front of the container so they are visible through the front of the container.
7. Make a hole through the rim of the plastic with a paper punch.
8. Tie a string through the hole and suspend your 3-D work of art from the string.
9. Note: If the plastic is too hard for a paper punch you can melt a hole. Grasp a nail with pliers and heat the tip over a candle flame. Poke the nail tip through the plastic rim. Only adults should use this method.

# A Photo Scrapbook for the Classroom

## Materials:

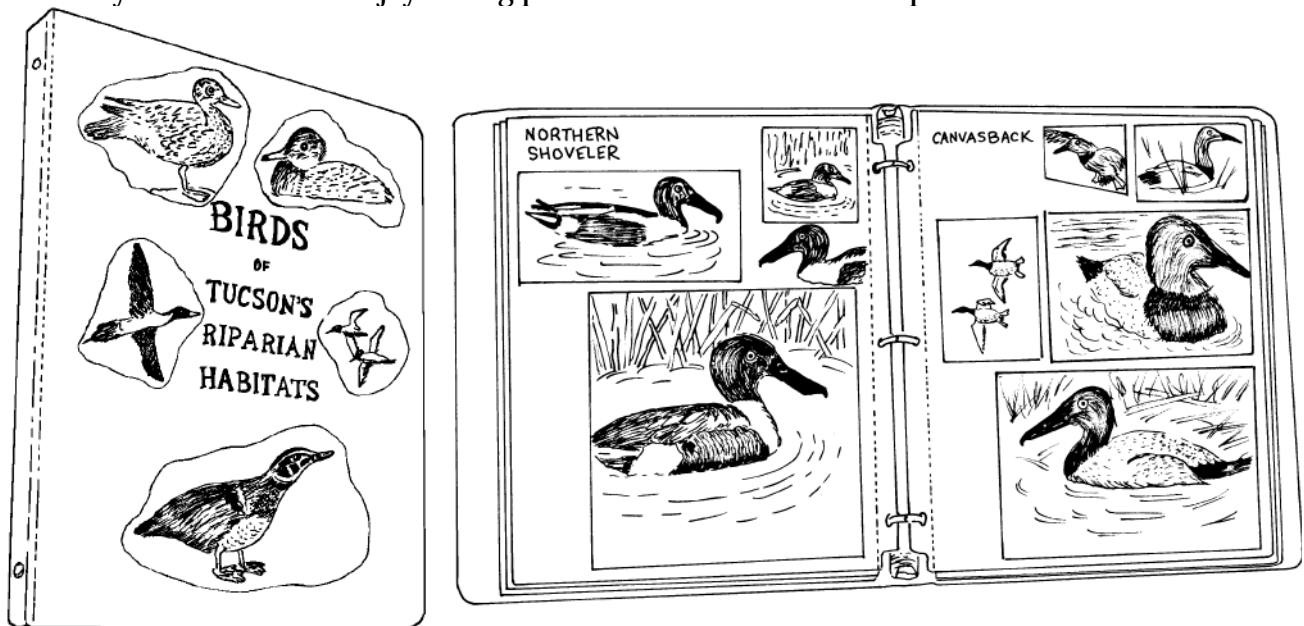
plastic sheet protectors (optional)	Three-ring binder
paper for binder	photos from magazines, calendars
scissors	glue

Make a classroom scrapbook of birds you have seen or could likely see in your schoolyard, neighborhood, or on class excursions. Pictures can be found in nature and photography magazines, calendars, and a variety of other publications.

A good way to organize the pictures is to have one species of bird per page. That way you may have many different pictures of the same bird on one page allowing students to study the bird in different postures and see sexual differences.

The book may contain only pictures and identifying names of birds, however your students may wish to add notes or anecdotes about the birds along with the pictures.

Each year students will enjoy adding pictures to the classroom scrapbook.



This photo scrapbook helps students learn and remember the water birds they observe when visiting a riparian area.



## Section Four ~ Appendix

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<b>How to Be a Good Birder</b>	<b>122</b>
<b>You Can Help Keep Birds Safe</b>	<b>123</b>
<b>Birding Hot Spots &amp; Local Resources—Tucson</b>	<b>124</b>
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## Using Binoculars

**Binoculars are not toys.  
They are precision instruments.  
Value them, use them with care, and you can  
enjoy them for many years.**



### Binocular care:



Do not touch the lenses with fingers or any objects.



Do not wipe lenses with any material other than lens-cleaning fluid and lens-cleaning tissue. These are inexpensive and available at drugstores or wherever eyeglasses are sold.



Keep the strap around the neck at all times.



Do not drop binoculars, bump them against anything, or swing them.

### Adjusting binoculars:



Set the diopter (rotating lens) on the right lens so that the marks on the diopter and on the solid part of the binoculars line up.



Move the hinged sides until your eyes feel comfortable looking through both lenses.



Look at a distant object through the binoculars.



Close the right eye (or cover the right eye piece) and focus the left eyepiece by turning the center focus wheel until the view is clear.



Close the left eye (or cover the left eye piece) and focus the right eye lens with the diopter.



Now all that needs to be done is focus with the center wheel—no matter what the distance of the object being viewed.

### Viewing objects through the binoculars:



Look at a distant object, such as a sign, a branch of a tree, or the top of a pole with your eyes.



Do not take your eyes from the object as you lift the binoculars to your eyes.



As you look through the binoculars you should see the object through the lenses.



## **Making and Maintaining a School Binocular Kit**



The assembly and organization of a binocular kit, plus the responsibility of maintenance is an excellent project that will get students involved in the care and use of these scientific tools.

Obtaining the binoculars is the first matter of business. Ask parents, the neighborhood association, or service clubs for donations of used binoculars. Look into grants for the purchase of new binoculars. You may begin with only a few, but the collection will grow with time.

Binoculars are precision instruments; therefore instructions for their care and handling must be strictly adhered to. They should be housed and organized in an adequate container. A container of lens cleaning fluid and cloth should be kept in the responsible classroom and used to clean lenses as needed.

### **Preparing the kit:**

1. Number each pair of binoculars with indelible paint, an etching tool, or a small tag to be attached. You may wish to do the same with each binocular case, because you may have various sizes of binoculars.
2. The kit should be a sturdy plastic container, neatly labeled with the name of the school and classroom responsible for maintenance.
3. The binoculars should be kept in their protective cases or pouches and neatly stacked in the container.
4. Attached to the box should be the instructions for the use and handling of the binoculars.
5. Include a checkout form so that the leader can keep track of which students the binoculars are assigned to.

### **Instructions for use of the kit:**

1. Remove binoculars from the case. Put lens caps in the case, zip case, and return case to the box.
2. Assign the students or teams of students the binoculars and enter the binoculars' numbers and students' names on the checkout form.
3. Students should be instructed in how to focus the binoculars.
4. Students should be instructed on the proper use of binoculars:
  - a. Place strap around neck at all times
  - b. Do not put fingers on lenses
  - c. Do not drop, swing, or bump binoculars.
  - d. Do not clean lenses with your shirt, tissue, or anything else.  
(The kit caretakers will do the lens cleaning.)

### **Returning binoculars to the kit:**

1. Check each pair of binoculars for missing and damaged equipment.
2. Find the correct case or pouch, place lens caps on the binoculars, return binoculars to the case, and zip the case.
3. Check off each student or team name upon return of the binoculars.
4. Return the case neatly in the box.

## **How to Be a Good Birder**

### **Ethics and Principles of a Responsible Bird Watcher**

There seem to be rules about everything and birding is no exception. The rules are simple but very important. Wildlife observations carry with them the responsibilities of not disturbing the animals or damaging the habitats.

#### **Bird walks:**

- Walk slowly and quietly.
- The group stays together and remains behind the leader.
- Point at a bird with your hand, keeping your arm close to your side. Raising your arm to point may scare away the bird.
- Do not wear bright colors.
- The leader is the **only** one to make sounds to bring a bird in closer, and this should be done sparingly. Some techniques are:
  - making a psh-psh sound
  - squeaking by sucking air in through the lips
  - noisily kissing the back of the hand
- Do not trespass on private property. Enter property only with permission of the owner.
- Do not try to attract birds with recordings of birdcalls.
- Do not relentlessly follow or harass birds.
- Stay on existing roads and trails to avoid trampling fragile habitat

#### **Nesting birds:**

- Observe nests from a distance. Do not disturb nesting birds because parent birds may abandon a nest that is disturbed and older nestlings that are disturbed may jump from a nest and be lost to predators.
- Never remove eggs from a nest, or remove nests—even old nests.
- Never break branches around a nest in order to get a better view or a photograph. The branches help to conceal the nest, or shade it from the sun.

#### **Laws:**

- It is illegal to remove eggs or bird nests, even after the nests are no longer in use.
- It is illegal to collect any feathers except those from Rock Doves, European Starlings, and House Sparrows or from game birds that have been legally hunted.
- It is illegal to harass birds at the nest or otherwise.

# **You Can Help Keep Birds Safe**

In Lesson Ten, Incredible Journeys, you learned how people are working to save migrating birds from dangers by preserving habitats and educating people about the dangers of pesticides. You may think that you, as an individual, wouldn't have much impact on saving birds. But you do. There are a number of things that you can do to help preserve our feathered friends.

## **Backyard Habitat**

You can develop a schoolyard or yard habitat for birds that will provide a safe refuge, food, and water. It will require some work but it need not cost much money. Local birds will move in and migrants will find a traveler's haven.

Here are the basic requirements:

- water: a shallow dish of clean water for drinking and bathing
- food: plants that supply seeds, berries, or attract insects
- shelter and nesting: thickets of shrubs, trees, piles of brush or rocks

## **Keep Kitty Inside**

Domestic house cats instinctively hunt and capture prey. They are descendants of wild cats of Africa and Asia and were brought here only a few hundred years ago. Therefore, our native birds and other wildlife did not evolve in their presence, thus did not develop defenses against them. It is estimated that house cats kill millions of birds each year. Putting a bell on a cat does not help. Cats learn to stalk prey silently, plus animals don't associate bells with danger. Well-fed cats still hunt because the hunting urge is strong. Even if a cat does not kill its prey, it does enough damage through injury and stress that the captured animal usually dies.

Another excellent reason for keeping kitty indoors is for the safety of the cat. Coyotes, dogs, cars, and even birds of prey kill cats. Outdoor cats rarely survive more than a few years, but indoor cats live a full life of 17 years or more.

Check out Audubon's website at [www.audubon.org/bird/cat](http://www.audubon.org/bird/cat) for more information and links.

## **Limit the Use of Pesticides**

Do not use pesticides or other toxins. Even when used according to directions, dozens of ingredients found in pesticides have been found to be lethal to birds. Weed control poisons are aimed at plants. They are still poisons and these chemicals also kill birds and other animals. For your health as well as for the health of the birds and other living creatures, limit your use of any kind of poisons in your home and yard.

## Birding Hot Spots—Tucson

Tucson may be a large urban area, but there are a surprising number of places to see birds within the city and in the nearby outlying areas. This chart briefly describes good birding sites, but be alert for other places as well, such as city parks and neighborhoods especially attractive to birds.

Some of the sites require fees or advanced reservations, or offer tours and other programs. Call ahead for information prior to planning a birding trip with your class.

Excellent books dedicated to Southern Arizona birding spots are *Finding Birds in Southeast Arizona* published by Tucson Audubon Society, *A Birder's Guide to Southeast Arizona* published by American Birding Associations, and *Tucson Wildlife Viewing Guide* by Glenn P. Frederick. See the Suggested Reading list for details.

Site	Address	Telephone	Area	Features
Agua Caliente Park	12325 East Roger Road	**	NE	A natural spring provides a riparian habitat. Trails wind through natural desert and around three ponds.
Arizona-Sonora Desert Museum	2021 W Kinney Road	883-1380	West	A large aviary and a walk-in hummingbird aviary allow close-up views of birds. Many birds may be observed along the trails.
Arthur Pack Regional Park	9101 N Thornydale Road	**	NW	Walk up Hardy Wash and look for birds in the huge ironwood and palo verde trees. Huge saguaros are riddled with woodpecker holes. During fall and winter birds feed from the huge mistletoes hanging in the trees.
Canada del Oro Riverfront Park	551 West Lambert Lane		NW	Walk south to Canada del Oro Wash. The sandy soil and water runoff from the Santa Catalinas allow for dense growth along the sides of the wash which provides a good habitat for birds.
Catalina State Park	11570 N Oracle Road	628-5798	North	A variety of desert birds can be seen along the many nature trails and at the day use picnic area.
Christopher Columbus Park	4600 N Silverbell	*	West	Two lakes, Silverbell and Archer, bring in many water birds. Great blue herons nest on an island.
Fort Lowell Park	2900 N Craycroft Rd	*	Central	Large trees, grassy areas, desert scrub and ponds attract a variety of birds.
Greasewood Park	1075 N Greasewood Road	*	West	Typical desert birds can be found along the trails in this natural desert park.

John F. Kennedy Regional Park	Ajo Way and Mission Road	*	SW	Water birds swim on the pond. In the western side of the park unpaved trails are scattered throughout the picnic area and to the hills beyond the fiesta area.
Lakeside Park	8300 E Stella	*	NE	Water birds swim on the pond. Common urban birds frequent the adjacent grassy areas.
Lincoln Regional Park	8280 East Escalante Road	*	SE	The Atturbury Wash Bird and Animal Sanctuary preserve native vegetation and animal habitat. Large mesquites and desert hackberry line the wash and provide good examples of riparian habitat.
Reid Park (Gene C. Reid Park)	22nd and Country Club	*	Central	The two ponds attract a variety ducks, herons, and kingfishers. Look for hawks in the trees. The common urban birds are prevalent.
Roger Road Wastewater Treatment Plant			NW	Two ponds plus trees attract a variety of birds especially during migration time. Call for information on open times.
Sabino Canyon Recreation Area	5700 N Santa Catalina Highway	749-8700		NE Excellent birding along the many trails.
Saguaro National Park – East District	3693 Old Spanish Trail	733-5153	East	A variety of desert birds can be seen along the many nature trails.
Saguaro National Park – West District	2700 N Kinney Road	733-5158	West	A variety of desert birds can be seen along the many nature trails.
Sam Lena Recreation Area	3400 S Country Club	**	East	A path around the raised reservoir offers views of ponds and many water and shorebirds. Common desert birds are in the desert scrub areas.
Snyder Hill Road Sewage Ponds	Snyder Hill Road (Avra Valley)	578-7341	West	A group of basins provide habitat for water birds, especially in winter and migration times. Desert birds are also in the area.
Sweetwater Wetlands	Sweetwater Drive (NW of Prince and I-10)	791-5080 ext 1461	West	This water recharge area with ponds, marsh, and trees attract many water birds. Huge flocks of blackbirds gather in the cattails. Many hawks and common desert birds are easily seen.

Tohono Chul Park	7366 North Paseo del Norte	575-8468	NW	The trails wind through gardens, washes, and natural desert. Several pools on the grounds attract wildlife. Good birdwatching throughout the park.
Tucson Botanical Gardens	2150 North Alvernon Way	326-9686	Central	A variety of vegetation types throughout the gardens provide many species of birds an oasis in the midst of busy streets.

\* 791-4873 (City of Tucson Parks and Recreation)

\*\* 740-2690 (Pima County Parks and Recreation)

## Tucson Resources

These organizations will help you with birding questions and provide materials and services.

### Tucson Audubon Society

300 East University Boulevard, Suite 120; Tucson AZ 85705; (520) 629-0757

A variety of bird kits and binoculars may be checked out. Brochures, Audubon Adventures program, and classroom presentations are available.

[www.audubon.org/chapter/az/tucson](http://www.audubon.org/chapter/az/tucson)

### Arizona Game and Fish Department

555 North Greasewood Road; Tucson AZ 85745; (520) 628-5376

Songbird Blues migration trunk may be checked out. Free posters, pocket guides, and classroom presentations are available.

[azgfd.gov](http://azgfd.gov)

### Sweetwater Wetlands

Sweetwater Drive (NW of Prince and I-10) (520) 791-5080 Ext 1461

Inquire about their school visitation program.

### Sonoran Desert Conservation Plan for Kids

(520) 740-8800; (520) 740-2690

[www.co.pima.az.us/cmo/sdcp/kids](http://www.co.pima.az.us/cmo/sdcp/kids)

## Birding Hot Spots—Phoenix

Phoenix is a large urban area, but there are a surprising number of places to see birds within the city and in the nearby outlying areas. This chart briefly describes good birding sites, but be alert for other places as well, such as city parks and neighborhoods especially attractive to birds.

Some of the sites require fees or advanced reservations, or offer tours and other programs. When possible, call ahead for information prior to planning a birding trip with your class.

Site	Location	Features
Gilbert Wetlands	SE corner of Greenfield and Guadalupe Roads; parking is east of the library.	This is a good place to see ducks, shorebirds, and migratory landbirds. Binoculars or a spotting scope would be helpful.
Gilbert Wildlife Area Ponds	From intersection of Elliot and Cooper Roads in Gilbert, go north on Cooper Rd .2 mile and turn east (right) into parking lot of Gilbert Fire Station # 215; park in far end of lot.	A paved path leads to the observation area. This is a good place to see ducks and shorebirds. Binoculars or a spotting scope would be helpful.
Indian Bend	Hayden Road at Indian School Road.	One pond is located on the east side of Hayden Road at Indian School Road. Another pond is north of McKellips Road and east of Hayden Road. The ponds offer especially good birding during winter months.
Desert Botanical Garden	In Papago Park. On Galvin Parkway between McDowell Road and Van Buren. 1201 N. Galvin Parkway	The Botanical Garden staff gives weekly morning bird walks. Call for the schedule. The gardens offer easy walking and good opportunities to see hummingbirds and desert species. (480) 941-1225.
Phoenix Zoo	In Papago Park. On Galvin Parkway between McDowell Road and Van Buren. 455 N. Galvin Parkway	The entrance to the zoo is a great place to see nesting cliff swallows and a variety of ducks. There is no fee for visiting the pond. (480) 273-1341
Phon D. Sutton Recreation Area; Salt River (between Granite Reef Dam and Saguaro Lake)	From Supersition Freeway (Hwy 60) take Power Road 8 miles north to the Granite Reef Recreation Area.	The Phon D. Sutton Recreation Area offers a 2.5 mile trail through riparian and desert habitats, and a variety of viewing opportunities. Bald eagles occur in the area.

Squaw Peak Park	Take Squaw Peak Drive north from Lincoln Drive and go to the end of the paved road to the parking area.	There are several trails leading through the desert, including a short nature trail. This area provides good opportunities to view desert species such as Curve-billed Thrashers, Cactus Wrens, Rock Wrens, and Black-throated Sparrows.
Thunderbird Park	From northbound I-17, take the Union Hills exit west to 59th Ave. Go north on 59th for 2 miles to the park. It is signed.	A parking area and viewing blind are at the pond area. This is a good place for water birds as well as desert species in the surrounding uplands.

## Phoenix Resources

These organizations will help you with birding questions and provide materials and services.

Arizona Game and Fish Department  
2222 West Greenway Road  
Phoenix, AZ 85023  
(602) 942-3000  
Offer free loan of Songbird Blues resource trunk, Focus Wild Arizona, natural history workshops for educators. Volunteers at the Wildlife Center at Adobe Mountain deliver programs to local schools, grades four and up and to public events. Requests placed at (602) 582-9806.  
Website: [azgfd.gov](http://azgfd.gov)

Arizona Bird Conservation Initiative (ABCI)  
(602) 789-3516

Arizona State Parks  
1300 West Washington  
Phoenix, AZ 85007  
(602) 542-4174  
Website: [www.pr.state.az.us](http://www.pr.state.az.us)

City of Phoenix Parks, Recreation, and Library Department  
Phoenix City Hall  
200 West Washington Street, 16<sup>th</sup> Floor  
Phoenix, AZ 85003  
(602) 262-6862  
Website: [www.ci.phoenix.gov/PARKS](http://www.ci.phoenix.gov/PARKS)

Desert Botanical Gardens  
1201 North Galvin Parkway  
Phoenix, AZ 85008  
(480) 941-1225  
Website: [www.dbg.org](http://www.dbg.org)

Maricopa County Parks and Recreation Department  
3475 West Durango Street  
Phoenix, AZ 85009  
(602) 506-2930  
Website: [www.maricopa.gov/parks](http://www.maricopa.gov/parks)

The Phoenix Zoo  
455 Galvin North Parkway  
Phoenix, AZ 85008  
(602) 273-1341  
Website: [www.phoenixzoo.org](http://www.phoenixzoo.org)

# Birds on the Internet

There are multitudes of bird sites on the internet. Using one of the search engines, type in the name of a bird (using the scientific name is best) or bird-related subject and in seconds you have a long list of web sites.

The *Internet Guide to Birds and Birding*, by Jack Sanders published by McGraw Hill, is an excellent directory to the best sites on the internet. But keep in mind that web sites come and go. New ones will appear. Old ones may disappear. The following are a few of the good—and probably more permanent—web sites for students and teachers. In turn, these sites have links that will take you to other web pages.

**www.audubon.org**

National Audubon Society including  
bird/cat danger information

**www.audubon.org/chapter/az/tucson**

Tucson Audubon Chapter with local  
information

**www.rmbo.org/pif/pifdb.html**

Partners in Flight site with  
information on protecting birds

**www.accutek.com/vulture**

anything you want to know about  
Turkey Vultures

**www.fws.gov/duckstamps/junior/junior.htm**

junior duck stamp program

**www.birds.cornell.edu**

Many good pages from the Cornell  
Ornithology Laboratory including  
project pigeon watch

*The following offer a variety of bird  
information, activities, and links.*

**www.birder.com**

**www.enchantedlearning.com/subjects/birds**

**www.birding.about.com**

**www.birdwatching.com**

**www.birdcast.org**

**www.birdzilla.com**

***Arizona Agencies and Organizations:***

**www.pr.state.az.us**

Arizona State Parks

**www.ci.phoenix.gov/PARKS**

City of Phoenix Parks, Recreation,  
and Library Department

**www.dbg.org**

Desert Botanical Gardens

**www.maricopa.gov/parks**

**Maricopa County** Parks and  
Recreation Department

**www.phoenixzoo.org**

The Phoenix Zoo

**www.co.pima.az.us/cmo/sdcp/kids**

Sonoran Desert Conservation Plan  
for kids

**www.azgfd.gov**

The Arizona Game and Fish Department

## Suggested Reading

Many good bird books are in print with new ones being published all the time. It is impractical to include a complete list here, so we suggest browsing through your school and neighborhood libraries or favorite bookstores for the books most appropriate for you and your students. However, here is a list of suggested titles that will help your class as they learn about the fascinating world of birds. Some titles may be out of print but are available in libraries. In most cases the books listed here concern birds of the Southwest, however there are some exceptions; as an example, there are wonderful books that tell of the migration story and even though they may feature birds not found in southwest deserts, the information is valid for all migrating species.

### FIELD GUIDES

Each of these field guide series includes a book about birds. These are written for adults, but are suitable for children's use.

Golden Guides (New York: Golden Books Publishing Company)

Popular pocket sized book, but covers the entire United States.

*Birds*

Easy Field Guides (Phoenix: Primer Publishers)

30 page booklet with excellent black and white line drawings and brief description of each.

*Easy Field Guide to Common Desert Birds of Arizona*

Kaufman Focus Guides (New York: Houghton Mifflin Company)

Illustrated with 2000 images digitally edited to emphasize field marks

*Birds of North America*

National Audubon Society Field Guides (New York: Alfred A. Knopf Incorporated)

*North American Birds: Western Region*

Peterson Field Guides (Boston: Houghton Mifflin Company)

There are over 50 titles in this popular series.

*Western Birds*

*Hawks*

Stokes, Donald and Lillian (Little, Brown and Company)

*Stokes Field Guide to Birds: Western Region*

Southwest Parks and Monuments series (Tucson: Southwest Parks and Monuments Association)

*50 Common Birds of the Southwest*

There are also field guides written especially for children.

National Audubon First Field Guides (New York: Scholastic, Incorporated)

The books in this series serve as home references as well as field guides and include background information about the subject, color photographs, and a reference section.

*Birds*

Peterson Field Guides for Young Naturalists (Boston: Houghton Mifflin)

These guides are not specific to the southwest.

*Backyard Birds*

*Songbirds*

*Shorebirds*

*Bizarre Birds*

Davis, Barbara

1997 *Field Guide to Birds of the Desert Southwest*. Houston: Gulf Publishing Company.

Robbins, Chandler S., Bertel Bruun, and Herbert S. Zim

1983 *Birds of North America*. New York: Golden Books Publishing Company.

## **RESOURCE MATERIAL**

Frederick, Glenn P.

*Tucson Wildlife Viewing Guide*. Tucson: Arizona Game and Fish Department Heritage Fund.  
Fourteen of the best wildlife viewing sites in the Tucson area are pictured and described.

Laughlin, Sarah B. and Diane M Pence, Editors

1997 *A Guide to Bird Education Resources*. Washington D.C.: The National Fish and Wildlife Foundation.

This Partners in Flight publication includes curricula, lessons, activities, workshops, sources of materials, and a variety of lessons from organizations and publications around the country.

Sanders, Jack

2000 *Internet Guide to Birds and Birding*. Blacklick, Ohio: The McGraw Hill Companies.  
A yellow pages directory to the best sites on the internet with a brief description of each.

Terres, John K.

1980 *The Audubon Society Encyclopedia of North American Birds*. New York: Alfred A. Knopf.  
This huge volume includes definitions, life histories, illustrations, diagrams, maps, and more.

## **FOR ADULTS AND OLDER CHILDREN**

Most of these books cover a wide area of desert life, but contain sections about birds.

Arizona Game and Fish Department

1999 *Arizona Wildlife Views: Special Edition*. Phoenix: Arizona Game and Fish Department.  
Filled with color photos and life histories of Arizona's birds (including a chapter on hummingbirds), lizards, snakes, amphibians, bats, and mammals.

Arizona-Sonora Desert Museum

2000 *A Natural History of the Sonoran Desert*. Tucson: Arizona-Sonora Desert Museum Press. Co-published with The University of California Press.

Baily, Jill and David Burnie

1997 *Birds*. New York: DK Publishing, Inc.

This small book is full of color photographs that covers many aspects of bird life

Brady, Irene

1998 *The Redrock Canyon Explorer*. Talent, OR: Nature Works.

Each page includes an illustrated natural history story about geology, plants, animals and other wonders of canyonland country. Facing pages are filled with interesting related facts. Although this book concerns the canyon environment north of the Sonoran Desert, many of the subjects are the same as or similar to those of the Sonoran Desert.

Burton, Robert

1997 *Concise Birdfeeder Handbook*. New York: DK Publishing, Inc.

A National Audubon Society guide to attracting and observing birds.

Choate, Ernest A.

1985 *The Dictionary of American Bird Names*. Boston: The Harvard Common Press.

This dictionary gives the meanings of common and scientific names of birds as well as a brief biography of people who have been honored by having their names given to birds.

Colombo, Luann

1998 *Hummingbirds: A Book and Build-Your-Own Feeder Kit*. Kansas City: Andrews McMeel Publishing.

A small booklet with beautiful drawings gives information about hummers, how to feed and care for the feeder, and other feeding tips and tricks. Included are parts to make your own feeder out of a plastic bottle.

Cox, Randall T.

1996 *Birder's Dictionary*. Helena MT: Falcon Press Publishing Company, Inc.

A pocketbook-size birder's glossary of biological, anatomical, physiological, behavioral, and taxonomic terms.

Evans, Doris and Jesus García

1998 *Desert Life, A Vocabulary/Vida Desertica, Vocabulario*. Tucson: Arizona-Sonora Desert Museum Press.

English-Spanish and Spanish-English translations for hundreds of natural history words with the emphasis on the Sonoran Desert.

Forshaw, Joseph, Steve Howell, Terence Lindsey, Rich Stallcup

1995 *Birding*. San Francisco: Time-Life Books.

This beautifully illustrated Nature Company Guide includes information about anatomy, feathers, flight, behavior, life cycles, and more. Descriptions of individual birds are arranged by habitat types.

Frederick, Glenn P.

*Tucson Wildlife Viewing Guide*. Tucson: Arizona Game and Fish Heritage Fund.

14 sites in and around Tucson where we can see wildlife.

George, Jean Craighead

1999 *Frightful's Mountain*. New York: Dutton Children's Books.

The story takes place in the Catskills. Sam must free his Peregrine Falcon, Frightful, because it is illegal to keep a bird of prey. Never a wild bird, Frightful must learn to survive natural and man-made dangers and follow his instinct to migrate.

Hanson, Roseann Beggy and Jonathan Hanson

1996 *Southern Arizona Nature Almanac*. Boulder, CO: Pruett Publishing Company.

A seasonal guide to Pima County and beyond. Each chapter covers a month's worth of natural happenings you are likely to experience.

Kaufman, Lynn Hassler

2000 *Birds of the American Southwest*. Tucson: Rio Nuevo Publishers.

Photographs of 86 birds are included, plus information on their habitats, markings, and characteristic behaviors.

Lazaroff, David Wentworth

1998 *Arizona-Sonora Desert Museum Book of Answers*. Tucson: Arizona-Sonora Desert Museum Press.

Lazaroff, David Wentworth

1995 *The Secret Lives of Hummingbirds*. Tucson: Arizona-Sonora Desert Museum Press.

22 page colorful booklet tells about the natural history of hummingbirds.

Merlin, Pinau

2001 *Bird Nests and Eggs*, Tucson: Arizona-Sonora Desert Museum Press.

A guide to the nests and eggs of 54 species of southern Arizona's birds.

Schinkel, David, and David Mohrhardt

1999 *Favorite Birds of the Southwest*. Holt, Michigan: Thunder Bay Press.

125 color illustrations and text cover birds of the desert, mountains, rivers, shores, marshes, ocean, forests, grassland, and agricultural land of Arizona, Texas, New Mexico, and southern California.

Smithsonian Migratory Bird Center

*Feathered Travelers/Viajeros Alados*. National Zoo, Washington DC: Smithsonian Migratory Bird Center.

In English and Spanish, this book explains where birds go when they migrate, their needs as they travel, and the problems they face.

Thompson, Bill

1997 *Bird Watching for Dummies*. Foster City, CA: IDG Books Worldwide

Another of the Dummies series, this book is full of information on all aspects of bird watching, feeding and housing birds, using binoculars, and more

Wheeler, Brian K. and William S. Clark

1999 *A Photographic Guide to North American Raptors*. San Diego: Academic Press.

Color photographs of raptors in flight and perched illustrate identifying field marks.

## BOOKS FOR YOUNG CHILDREN

Albert, Richard E.

1994 *Alejandro's Gift*. San Francisco: Chronicle Books.

Lonely in his desert home, Alejandro builds an oasis to attract desert animals and discovers his labors to be a gift to himself as well as to the animals.

Aronsky, Jim

1998 *Watching Desert Wildlife*. Washington D.C.: National Geographic Society.

Full page illustrations and text include the roadrunner, Gila monster, snakes, birds, and squirrels.

Asch, Frank

1998 *Cactus Poems*. San Diego: Harcourt Brace and Co.

A celebration of odd and awesome aspects of North American deserts. Beautiful photographs illustrate the poems.

Bash, Barbara

1990 *Desert Giant: The World of the Saguaro Cactus*. Boston: Little, Brown and Company.

Identifies birds and other creatures that are dependent upon the saguaro cactus for food and shelter.

Bash, Barbara

1990 *Urban Roosts*. Boston: Little Brown and Company

Describes the birds that make their homes in cities and have adapted to city life.

Baylor, Byrd

1976 *Hawk, I'm Your Brother*. New York: Macmillan Publishing Company.

Rudy adopts a young hawk hoping their kinship will help him learn how to fly. He finally realizes he must free the bird so it can fly with its hawk brothers.

Cherry, Lynne

1997 *Flute's Journey: The Life of a Wood Thrush*. San Diego: Harcourt Brace and Company.

This is the story of one young wood thrush's first migration over a thousand miles from Maryland to Costa Rica and back. Flute encounters perils that threaten songbirds. Survival depends on luck, instincts, and people working hard to preserve habitat.

Ekkehart, Molatki

1996 *The Magic Hummingbird: A Hopi Folktale*. Santa Fe: Kiva Publishers, Inc.

This is an authentic Hopi folktale about two young children and their relationship with a magic hummingbird. The tale incorporates the importance of living in the harmony with the land, rain, and crops.

Golden, Augusta

1989 *Ducks Don't Get Wet*. New York: Harper Collins Publishers, Inc.

This "Let's-Read-to-Find-Out" book is written at a primary level, but older students will also enjoy the illustrations and text about why ducks don't get wet plus information about ten different kinds of ducks.

Goodall, Jane

2000 *The Eagle and the Wren*. New York: North-South Books Incorporated.

This is a retelling of the fable of lark, dove, vulture, and eagle who hold a contest to see who can soar the highest. It illustrates how we depend upon each other for help and support.

Guiberson, Brenda Z.

1991 *Cactus Hotel*. New York: Henry Holt and Company.

The saguaro is home for many animals.

Heller, Ruth

1995 *How to Hide a Parakeet and other birds*. New York: Grosset & Dunlap, Publishers.

Delightful drawings show how birds' camouflage make them "disappear" into their surroundings. Also available in Spanish.

Jarvis, Kila and Denver W. Holt

1996 *Owls: Whoo are they?* Missoula, MT: Mountain Press Publishing Company.

Fascinating facts about all 19 species of owls found in the U.S. and Canada.

Jones, Ann

1999 *Bird Talk*. New York: Greenwillow Books

Delightful illustrations and the words birds seem to be saying help remember which bird is "talking". Though this book is about eastern U.S. birds, it may give ideas of memory tricks to use with southwestern birds.

Marsh, T.J. and Jennifer Ward

1998 *Way Out in the Desert*. Flagstaff: Rising Moon.

This is the Sonoran Desert version of "Over in the Meadow..."

Lasky, Kathryn

1995 *She's Wearing a Dead Bird on Her Head*. Hyperion Press

Marshall, Jody

1994 *In the Air and Everywhere*. New York: W.H. Freeman and Company

Five pop-up pages, each covering a different habitat, are filled with interesting information about the birds that live in them.

Miller, Debbie S.

1996 *Flight of the Golden Plover: The Amazing Migration between Hawaii and Alaska*. Seattle: Alaska Northwest Books.

A beautifully illustrated children's book that takes an in-depth look at the Pacific Golden Plover, a shorebird that makes one of the greatest annual migrations. Their numbers were reduced through hunting, but laws were passed and today's populations are up and stable.

Miller, Sarah, Ed

1993 *Birds: The DK Picturpedia*. New York: DK Publishing Company.

Large format, beautiful pictures of birds in various habitats around the world.

National Geographic Society

1995 *Creatures of the Desert World*. Washington D.C.: National Geographic Society.

Pop-up book full of Sonoran Desert plants and animals.

Parsons, Alexandra

1990 *Amazing Birds*. New York: Alfred A. Knopf.

A close-up look at amazing but true bird behavior and structure.

Pallotta, Jerry

1986 *The BIRD Alphabet Book*. Watertown, MA: Charlesbridge Publishing.

An ABC book of birds from around the world beautifully illustrated. A good book to show different adaptations.

Politi, Leo

1987 *Song of the Swallows*. New York: MacMillan Publishing Company.

Originally written in 1948, this book won the Caldecott Medal in 1950. It tells the story of Juan who plants his own garden at San Juan Capistrano hoping the swallows will nest there when they return on St. Joseph's Day next spring.

Philabaum, Dabney Miller and Nancy Lenches-Alegret

1996 *Desert Buddies*. Tucson: Earth Buddies.

Simple text and delightful line drawings by Nancy Lenches Alegret introduce children to desert life. Children may color in the pictures.

Priebe, Mac

2000 *The Peregrine Falcon: Endangered No More*. Norwalk, Connecticut: Mindful Publishing.

The story and photographs tell how the Peregrine Falcon was forced to near extinction, but is now off the Endangered Species List because of dedicated groups of people who worked to rebuild populations.

Rabe, Tish

1998 *Fine Feathered Friends*. New York: Random House.

This Cat-in-the-Hat's Learning Library series book tells about different kinds of birds and their behaviors in delightful Dr. Seuss-type rhymes and illustrations.

Ryder, Joanne

1992 *Dancers in the Garden*. San Francisco: Sierra Club Books for Children.

Water color illustrations and text follow the movements of a hummingbird and its mate during their day in a sunny garden.

Wood, Audrey

1997 *Birdsong*. San Diego: Harcourt Brace and Company.

A variety of North American birds and their vocalizations are depicted. Beautifully illustrated.

Wilson, Bennett

*Birdwatchers Coloring Book of the Southwest*.

The book contains 30 birds, with captions, for children (or adults) to color.

Wright-Frierson, Virginia

1996 *A Desert Scrapbook: Dawn to Dusk in the Sonoran Desert*. New York: Simon and Schuster.  
The artist/author paints and writes about her desert backyard.

Zoehfeld, Kathleen Weidner

1997 *Cactus Cafe*. Norwalk, CT: Trudy Corporation.

The saguaro cactus as an important food and nesting site for many desert animals.

## **ACTIVITIES and PROJECTS**

Cooper, Ann C.

1994 *Owls on Silent Wings*. Niwot, CO: Denver Museum of Natural History and Roberts Rinehart Publishers.

This Wonder Series book includes information about owls as well as a variety of owl-related activities.

National Wildlife Federation.

1998 *Birds, Birds, Birds (Ranger Rick's Nature Scope)*. New York: McGraw-Hill.

Included are many activities and background information for all elementary grades.

Tucson Audubon Society

1999 *Schoolyard Habitat and Garden Resources Directory: A Sampling of Local Projects*. Tucson: Tucson Audubon Society.

## **CDs**

Colver, Kevin J. with Donald and Lillian Stokes

1999 *Stokes Field Guide to Bird Songs, Western Region*. New York: Time Warner Audio Books.

Calls and songs of 551 species of western birds and an informative booklet.

Keller, Geoffrey A.

2001 *Bird Songs of Southeastern Arizona and Sonora, Mexico*. Ithaca, New York: Cornell Laboratory of Ornithology.

Peterson, Roger Tory

1992 *Western Bird Songs*. Boston: Houghton Mifflin Company.

Two compact disks, plus a booklet, of the songs of the Western North American birds.

## **CD ROM**

Peterson, Roger Tory

1995 *North American Birds*. Boston: Houghton Mifflin Company.

This CD Rom provides access to all the birds by visual category, family, and species. Also includes a search tool to identify birds, games to test and improve birding skills, multimedia essays on birds, and more.

## VIDEOS

Westervelt, Miriam Olivia

1990 *A Home for Pearl*. National Fish and Wildlife Foundation and Colorado Division of Wildlife. This instructional video about wildlife habitat for elementary school children includes four parts, each 15 to 20 minutes in length. Urban wildlife, predators, endangered species, and the effects of habitat loss are some of the issues presented.

Eyewitness Video Series

1994 *Birds*. Dorling Kindersley Ltd. and BBC Lionheart Television Intl. Inc.

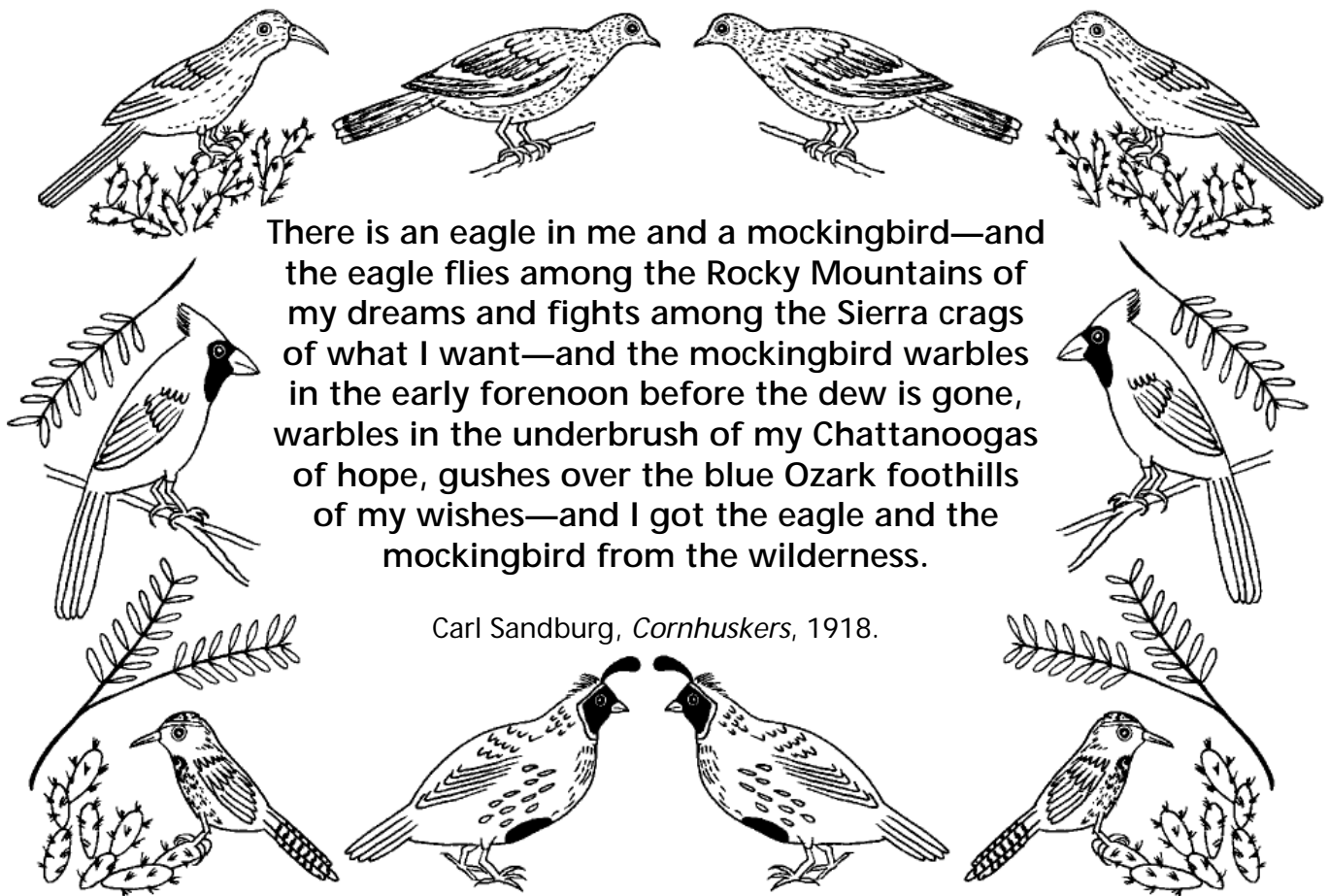
Based on the Eyewitness book, stunning graphics and special effects bring birds to life.

Arizona-Sonora Desert Museum and KUAT Communications Group

*Birds in the Sonoran Desert* #410

*Birds of Passage (Migration)* #705

From the locally produced award winning series of televised nature programs.



There is an eagle in me and a mockingbird—and  
the eagle flies among the Rocky Mountains of  
my dreams and fights among the Sierra crags  
of what I want—and the mockingbird warbles  
in the early forenoon before the dew is gone,  
warbles in the underbrush of my Chattanooga  
of hope, gushes over the blue Ozark foothills  
of my wishes—and I got the eagle and the  
mockingbird from the wilderness.

Carl Sandburg, *Cornhuskers*, 1918.

TUCSON AUDUBON SOCIETY

Checklist of Birds of Southeast Arizona

Updated 2001 by Chris Benesh and Mark Stevenson

Locality \_\_\_\_\_  
Date \_\_\_\_\_ Time \_\_\_\_\_ Weather \_\_\_\_\_  
Observers \_\_\_\_\_

SE Arizona is considered to be Arizona south of 33° and east of 112°. Symbols indicating abundance in the preferred habitat are: C- Common, F-Fairly Common, U- Uncommon, R- Rare (present in very small numbers, usually reported annually), Ca-Casual (does not occur annually), X- Accidental (five or fewer records), I- Irregular (found in varying numbers from year to year), L- Local, H- Historical records, none since 1970.

?- status uncertain, often complex or changing. Symbols indicating seasonal incidence are: p- present all year, though not necessarily the same individuals, w- winter, sp-spring, su-summer, f-fall, t-transient. Non-native birds and those present via introductions are italicized. E-denotes species on the Federal endangered list.

Species in parentheses are undocumented anywhere in AZ by specimen or other physical evidence but are sight records by experienced birders. Species followed by an asterisk (\*) warrant careful documentation for review by the Arizona Bird Committee. Those followed by a (#) warrant sketch details. Written reports and physical documentation (photo, video or tape recording) should be sent to Gary H. Rosenberg, Sec'y, AZ Bird Committee, PO Box 91856, Tucson, AZ 85752.

Tucson Rare Bird Alert: (520) 798-1005. Please report your unusual sightings in SE Arizona ASAP to the number given on the RBA Tape, currently (520) 696-4461 X3.

LOONS

\_\_\_ Red-throated Loon\* H  
\_\_\_ Pacific Loon# Ca-t,w  
\_\_\_ Common Loon R-t,w

GREBES

\_\_\_ Least Grebe\* Ca-t,w  
\_\_\_ Pied-billed Grebe C-w,U-su  
\_\_\_ Horned Grebe# R-t,w  
\_\_\_ Eared Grebe C-t,U-w,Ca-su  
\_\_\_ Western Grebe R-t,R-L,w  
\_\_\_ Clark's Grebe R-t

STORM-PETRELS

\_\_\_ Least Storm-Petrel\* X  
\_\_\_ Black-crowned Night-Heron X

TROPICBIRDS

\_\_\_ Red-billed Tropicbird\* X

PELICANS

\_\_\_ American Pelican U-t  
\_\_\_ Brown Pelican-E R-su,f

CORMORANTS & DARTERS

\_\_\_ Neotropic Cormorant R-l,p  
\_\_\_ Double-crested Cormorant U-p  
\_\_\_ Anhinga\* H

\_\_\_ California Condor\*-E

FRIGATEBIRDS

\_\_\_ Magnificent Frigatebird\* H  
\_\_\_ American Bittern R-t,w

BITTERNS & HERONS

\_\_\_ Least Bittern U-L-su,R-w  
\_\_\_ Great Blue Heron F-p  
\_\_\_ Great Egret C-w,U-su  
\_\_\_ Snowy Egret R-t,w  
\_\_\_ Little Blue Heron# U-L,su,Ca-w  
\_\_\_ Tricolored Heron# Ca  
\_\_\_ Reddish Egret\* Ca  
\_\_\_ Cattle Egret R-t,su,Ca-w  
\_\_\_ Green Heron F-p  
\_\_\_ Black-crowned Night-Heron U-p

IBISES & SPOONBILLS

\_\_\_ White Ibis\* U-t  
\_\_\_ White-faced Ibis R-su,f  
\_\_\_ Roseate Spoonbill\* Ca-su,f

AMER. VULTURES & STORKS

\_\_\_ Wood Stork\* R-l,p  
\_\_\_ Black Vulture U-p  
\_\_\_ Turkey Vulture H

SWANS, GEESE & DUCKS

\_\_\_ Black-bellied U-Su,R-w  
\_\_\_ Whistling Duck X  
\_\_\_ Fulvous Whistling-Duck\*  
\_\_\_ Greater White-fronted Goose R-t,w  
\_\_\_ Snow Goose U-t,w  
\_\_\_ Ross's Goose# R-t,w  
\_\_\_ Canada Goose U-w  
\_\_\_ Brant\* X  
\_\_\_ Trumpeter Swan\* X-?  
\_\_\_ Tundra Swan Ca-t,w  
\_\_\_ Wood Duck U-t,w  
\_\_\_ Gadwall F-t,w  
\_\_\_ Eurasian Wigeon# Ca-t,w  
\_\_\_ American Wigeon C-t,w  
\_\_\_ Mallard U-p,C-w  
\_\_\_ Blue-winged Teal U-t,R-w  
\_\_\_ Cinnamon Teal C-t,R-w  
\_\_\_ Northern Shoveler C-t,w  
\_\_\_ Northern Pintail C-t,w  
\_\_\_ Garganey\* X  
\_\_\_ Green-winged Teal C-t,w  
\_\_\_ Canvasback U-t,w  
\_\_\_ Redhead F-t,w,R-su  
\_\_\_ Ring-necked Duck C-t,w  
\_\_\_ Greater Scaup# Ca-t,w  
\_\_\_ Lesser Scaup C-t,w  
\_\_\_ Harlequin Duck\* X  
\_\_\_ Surf Scoter# Ca-t  
\_\_\_ White-winged Scoter# Ca-t  
\_\_\_ Black Scoter\* X  
\_\_\_ Long-tailed Duck# Ca-t,w  
\_\_\_ Bufflehead U-t,w  
\_\_\_ Common Goldeneye R-t,w  
\_\_\_ Barrow's Goldeneye\* X  
\_\_\_ Hooded Merganser R-t,w  
\_\_\_ Common Merganser U-t,w  
\_\_\_ Red-breasted Merganser R-t,w  
\_\_\_ Ruddy Duck C-w,U-su

KITES, HAWKS & EAGLES

\_\_\_ Osprey U-t,Ca-w  
\_\_\_ (Swallow-tailed Kite)\* X  
\_\_\_ White-tailed Kite R-l,p  
\_\_\_ Mississippi Kite U-L-su  
\_\_\_ Bald Eagle R-t,w  
\_\_\_ Northern Harrier C-t,w  
\_\_\_ Sharp-shinned Hawk C-t,w,R-su  
\_\_\_ Cooper's Hawk C-t,w,U-su  
\_\_\_ Northern Goshawk R-p  
\_\_\_ Gray Hawk U-L-su  
\_\_\_ Common Black-Hawk U-L-su,R-t  
\_\_\_ Harris's Hawk F-p  
\_\_\_ Red-shouldered Hawk\* Ca-t,w  
\_\_\_ Broad-winged Hawk\* Ca-t,X-w  
\_\_\_ Short-tailed Hawk\* X  
\_\_\_ Swainson's Hawk C-t,U-s

\_\_\_ White-tailed Hawk\* X  
\_\_\_ Zone-tailed Hawk U-su,X-w  
\_\_\_ Red-tailed Hawk C-p  
\_\_\_ Ferruginous Hawk U-w  
\_\_\_ Rough-legged Hawk R-t,w  
\_\_\_ Golden Eagle U-p  
\_\_\_ CARACARAS & FALCONS  
\_\_\_ Crested Caracara R-L-p  
\_\_\_ American Kestrel C-t,w,U-su  
\_\_\_ Merlin U-t,w  
\_\_\_ Aplomado Falcon\* H  
\_\_\_ Peregrine Falcon R-p  
\_\_\_ Prairie Falcon R-p,U-t,w  
\_\_\_ Wild Turkey R-p  
\_\_\_ Scaled Quail C-p  
\_\_\_ Gambel's Quail C-p  
\_\_\_ N. "Masked" Bobwhite-E R-p?  
\_\_\_ Montezuma Quail U-p  
\_\_\_ Black Rail\* X  
\_\_\_ Clapper Rail-E# R-su?  
\_\_\_ Virginia Rail U-L-p  
\_\_\_ Sora U-t,w  
\_\_\_ Purple Gallinule\* Ca-t  
\_\_\_ Common Moorhen U-p  
\_\_\_ American Coot C-p  
\_\_\_ Sandhill Crane C-L-w  
\_\_\_ Whooping Crane\*-E X

RAILS, GALLINULES & COOTS

\_\_\_ Black-bellied Plover R-t  
\_\_\_ American Golden-Plover\* Ca-t  
\_\_\_ Pacific Golden-Plover X  
\_\_\_ Snowy Plover R-t,su  
\_\_\_ Semipalmated Plover U-f,R-sp  
\_\_\_ Killdeer C-p  
\_\_\_ Mountain Plover R-L-w  
\_\_\_ Northern Jacana\* X  
\_\_\_ Black-necked Stilt C-L-su,R-L,w  
\_\_\_ American Avocet F-L-su,F-t  
\_\_\_ Greater Yellowlegs C-t,Ca-w  
\_\_\_ Lesser Yellowlegs F-f,U-sp  
\_\_\_ Solitary Sandpiper U-t  
\_\_\_ Willet U-t  
\_\_\_ Spotted Sandpiper C-t,U-w  
\_\_\_ Upland Sandpiper\* X  
\_\_\_ Whimbrel# Ca-t  
\_\_\_ Long-billed Curlew U-t,R-p  
\_\_\_ Hudsonian Godwit\* X  
\_\_\_ Marbled Godwit R-t  
\_\_\_ Ruddy Turnstone# Ca-f,X-sp  
\_\_\_ Red Knot# Ca-f  
\_\_\_ Sanderling R-f,Ca-sp

\_\_\_ Semipalmated Sandpiper # R-f,Ca-sp  
\_\_\_ Western Sandpiper C-t,Ca-w  
\_\_\_ Least Sandpiper C-t,U-w  
\_\_\_ White-rumped Sandpiper\* X  
\_\_\_ Baird's Sandpiper F-f,R-sp  
\_\_\_ Pectoral Sandpiper U-f,Ca-sp  
\_\_\_ Dunlin R-f,Ca-sp,w  
\_\_\_ Stilt Sandpiper U-f,Ca-sp  
\_\_\_ Ruff\* X  
\_\_\_ Short-billed Dowitcher# R-f,Ca-sp  
\_\_\_ Long-billed Dowitcher C-t,R-w  
\_\_\_ Common Snipe C-t,w  
\_\_\_ Wilson's Phalarope C-t,X-w  
\_\_\_ Red-necked Phalarope U-f,R-sp  
\_\_\_ Red Phalarope# Ca-t  
\_\_\_ SKUAS, GULLS, TERNS & SKIMMERS  
\_\_\_ Long-tailed Jaeger\* X  
\_\_\_ Laughing Gull\* Ca  
\_\_\_ Franklin's Gull U-sp,R-f  
\_\_\_ Bonaparte's Gull U-t,t,Ca-w,su  
\_\_\_ Heermann's Gull# Ca  
\_\_\_ Ring-billed Gull F-t,R-su,w  
\_\_\_ California Gull R-t  
\_\_\_ Herring Gull# Ca-f,X-sp  
\_\_\_ Sabine's Gull# Ca-f  
\_\_\_ Black-legged Kittiwake\* X  
\_\_\_ Gull-billed Tern\* X  
\_\_\_ Caspian Tern Ca-t  
\_\_\_ Elegant Tern\* X  
\_\_\_ Common Tern# Ca-t  
\_\_\_ Arctic Tern\* X  
\_\_\_ Forster's Tern R-f,Ca-sp  
\_\_\_ Least Tern# Ca-sp,X-f  
\_\_\_ Black Tern U-t  
\_\_\_ Black Skimmer\* X

PIGEONS & Doves

\_\_\_ Rock Dove C-p  
\_\_\_ Band-tailed Pigeon C-su,R-w  
\_\_\_ Eurasian Collared-Dove# X  
\_\_\_ White-winged Dove C-su,R-L,w  
\_\_\_ Mourning Dove C-p  
\_\_\_ Inca Dove C-p  
\_\_\_ Common Ground-Dove U-s,R-w  
\_\_\_ Ruddy Ground-Dove# R-t,w  
\_\_\_ PARROTS  
\_\_\_ Thick-billed Parrot\* ?H  
\_\_\_ CUCKOOS, ROADRUNNERS & ANIS  
\_\_\_ Black-billed Cuckoo\* X  
\_\_\_ Yellow-billed Cuckoo F-su,X-w  
\_\_\_ Greater Roadrunner C-p  
\_\_\_ Groove-billed Ani\* Ca-su,f  
\_\_\_ BARN & TYPICAL OWLS  
\_\_\_ Barn Owl C-p

\_\_\_ Flamulated Owl F-su  
\_\_\_ Western Screech-Owl C-p  
\_\_\_ Whiskered Screech-Owl C-p  
\_\_\_ Great Horned Owl C-p  
\_\_\_ Northern Pygmy-Owl U-p  
\_\_\_ Ferruginous Pygmy-Owl#-E R-L-p  
\_\_\_ Elf Owl C-su  
\_\_\_ Burrowing Owl U-L-p  
\_\_\_ Spotted Owl U-p  
\_\_\_ Long-eared Owl R-w,Ca-su  
\_\_\_ Short-eared Owl R-w  
\_\_\_ Northern Saw-whet Owl R-p

NIGHTHAWKS & NIGHTJARS

\_\_\_ Lesser Nighthawk C-su  
\_\_\_ Common Nighthawk F-L-su  
\_\_\_ Common Poorwill C-su,X-w  
\_\_\_ Buff-collared Nightjar# R-L-su  
\_\_\_ Whip-poor-will C-su  
\_\_\_ SWIFTS  
\_\_\_ (Black Swift)\* Ca-t, su  
\_\_\_ Chimney Swift\* ?Ca-su, X-t  
\_\_\_ Vaux's Swift U-t  
\_\_\_ White-throated Swift C-su,U-w

HUMMINGBIRDS

\_\_\_ Broad-billed Hummingbird C-su,R-w  
\_\_\_ White-eared Hummingbird# R-su  
\_\_\_ Berylline Hummingbird\* Ca-su  
\_\_\_ Cinnamon Hummingbird\* X  
\_\_\_ Violet-crowned Hummingbird U-L-su,Ca-w  
\_\_\_ Blue-throated Hummingbird F-s,R-w  
\_\_\_ Magnificent Hummingbird C-s,R-w  
\_\_\_ Plain-capped Starthroat\* Ca-su  
\_\_\_ Lucifer Hummingbird# R-su  
\_\_\_ Black-chinned Hummingbird C-su,t  
\_\_\_ Anna's Hummingbird C-w,U-su  
\_\_\_ Costa's Hummingbird C-w,sp,R-su  
\_\_\_ Callopie Hummingbird U-f,R-sp  
\_\_\_ Bumblebee Hummingbird\* H  
\_\_\_ Broad-tailed Hummingbird C-su,U-t  
\_\_\_ Rufous Hummingbird C-f,U-sp  
\_\_\_ Allen's Hummingbird R-su,f,X-sp  
\_\_\_ TROGONS  
\_\_\_ Elegant Trogon U-su,Ca-w  
\_\_\_ Eared Trogon\* ?Ca  
\_\_\_ KINGFISHERS  
\_\_\_ Belted Kingfisher F-t,w  
\_\_\_ Green Kingfisher R-l-L-p

WOODPECKERS

___ Lewis's Woodpecker	R-t,w	Ca-t,su	___ House Wren	U-su,C-w	___ Orange-crowned	C-t,U-w,R-L-su	___ Hepatic Tanager	F-su,Ca-w	___ Bobolink#	Ca-t
___ Red-headed Woodpecker*	X	C-su	___ Winter Wren#	R-w	___ Warbler	F-t,X-w	___ Summer Tanager	C-su,Ca-w	___ Red-winged Blackbird	F-s,C-w
___ Acorn Woodpecker	C-p	X	___ Marsh Wren	F-t,w	___ Nashville Warbler	F-t,su	___ Scarlet Tanager*	Ca-t	___ Eastern Meadowlark	C-p
___ Gila Woodpecker	C-p	R-L-su	<b>DIPPERS</b>	R-L-su,R-w	___ Virginia's Warbler	C-su	___ Western Tanager	C-t,su,X-w	___ Western Meadowlark	C-w,R-L-su
___ Williamson's Sapsucker	R-t,w	Ca-t,su	___ American Dipper	U-p	___ Lucy's Warbler	Ca-t,w	___ Flame-colored Tanager*	Ca-su	___ Yellow-headed Blackbird	C-w,R-su
___ Yellow-bellied Sapsucker#	Ca-t,w	C-su,t,R-w	<b>KINGLETS &amp; GNATCATCHERS</b>	C-t,w,R-su	___ Crescent-chested Warbler*	R-t	<b>EMBERIZINES</b>		___ Rusty Blackbird*	Ca-t,w
___ Red-naped Sapsucker	F-t,w	F-t,R-w	___ Ruby-crowned Kinglet	X	___ Tropical Parula*	X	___ Green-tailed Towhee	C-t,w	___ Brewer's Blackbird	C-t,w
___ Red-breasted Sapsucker*	Ca-t,w?	X	___ Blue-gray Gnatcatcher	F-p	___ Yellow Warbler	C-t,su,X-w	___ Spotted Towhee	C-p	___ Common Grackle*	Ca-t,w
___ Ladder-backed Woodpecker	C-p	C-su,U-w	___ Black-tailed Gnatcatcher	C-p	___ Chestnut-sided Warbler#	Ca-t,w	___ Eastern Towhee*	X	___ Great-tailed Grackle	C-p
___ Downy Woodpecker*	X?	C-t,su	___ Black-capped Gnatcatcher*	Ca-?	___ Magnolia Warbler*	Ca-t	___ Canyon Towhee	C-p	___ Bronzed Cowbird	F-s,R-L-w
___ Hairy Woodpecker	U-p	Ca-f,X-sp	<b>THRUSHES</b>	X	___ Cape May Warbler*	Ca-t,w	___ Albert's Towhee	C-p	___ Brown-headed Cowbird	C-p
___ Arizona Woodpecker	U-p	Ca-t	___ Northern Wheatear*	X	___ Black-throated Blue	Ca-t,X-w	___ Rufous-winged Sparrow	U-p	___ Black-vented Oriole*	X
___ Northern Flicker	C-p	Ca	___ Eastern Bluebird	U-L-p	___ Warbler#	Ca-t,X-w	___ Cassin's Sparrow	C-su,R-w	___ Orchard Oriole*	Ca-t,X-w
___ Red-shafted	Ca-t,w	C-p	___ Western Bluebird	F-w,U-p	___ Yellow-rumped Warbler	C-p	___ Botteri's Sparrow	F-L-su	___ Hooded Oriole	C-su,Ca-w
___ Yellow-shafted#	C-p	X	___ Mountain Bluebird	U-l,w	___ Audubon's form	R-t,w	___ Rufous-crowned Sparrow	F-p	___ Streak-backed Oriole*	Ca-w,X-p?
<b>JAYS, CROWS &amp; RAVENS</b>			___ Townsend's Solitaire	U-w,t	___ Myrtle form		___ Five-striped Sparrow	R-L-p?	___ Baltimore Oriole*	Ca-sp
___ Steller's Jay	C-p	U-p	___ Veery*	X	___ Black-throated Gray Warbler	C-su,t,R-w	___ Chipping Sparrow	C-t,w,U-L-su	___ Bullock's Oriole	C-su,X-w
___ Blue Jay*	X	C-p	___ Gray-cheeked Thrush*	H	___ Black-throated Green Warbler*		___ Clay-colored Sparrow#	R-t,w	___ Scott's Oriole	C-su,Ca-w
___ Western Scrub-Jay	C-p	U-t	___ Swainson's Thrush	U-t	___ Townsend's Warbler	Ca-t	___ Brewer's Sparrow	C-t,w	<b>CARDUELINE FINCHES</b>	
___ Mexican Jay	Ca-w	C-p	___ Hermit Thrush	C-p	___ Hermit Warbler	C-t,w	___ Field Sparrow*	X	___ Pine Grosbeak*	X
___ Clark's Nutcracker	R-L-w	Ca-t	___ Wood Thrush*	Ca-t	___ Blackburnian Warbler*	Ca-t	___ Black-chinned Sparrow	U-L-p	___ Purple Finch*	Ca-t,w
___ American Crow	C-p	C-p	___ Rufous-backed	Ca-w,X-su	___ Yellow-throated Warbler*	Ca-t,X-w,su	___ Vesper Sparrow	C-t,w	___ Cassin's Finch	C-p
___ Chihuahuan Raven	C-p	C-p	___ Robin#	Ca-w,X-su	___ Grace's Warbler	C-su	___ Lark Sparrow	C-p	___ House Finch	C-p
___ Common Raven	C-p	C-p	___ American Robin	Ca-w,X-su	___ Prairie Warbler*	X	___ Black-throated Sparrow	C-p	___ Red Crossbill	U-l,p
<b>LARKS</b>			___ Varied Thrush#	Ca-f,w	___ Pine Warbler*	Ca-w,X-t	___ Sage Sparrow	C-L-w	___ Pine Siskin	F-l,t,w,R-su
___ Horned Lark	C-p	C-p	___ Aztec Thrush*	Ca-su,f,X-w,sp	___ Palm Warbler#	Ca-t,X-w	___ Lark Bunting	C-t,w	___ Lesser Goldfinch	C-p
<b>SWALLOWS</b>			<b>MOCKINGBIRDS, THRASHERS &amp; ALLIES</b>		___ Prairie Warbler*	Ca-t,X-w	___ Savannah Sparrow	C-t,w	___ Lawrence's Goldfinch	U-l,t,w,X-su
___ Purple Martin	C-su	C-t	___ Gray Catbird#	Ca-w,t	___ Bay-breasted Warbler*	Ca-t	___ Grasshopper Sparrow	C-p	___ American Goldfinch	U-t,w
___ Tree Swallow	C-t	C-t,su	___ Northern Mockingbird	C-p	___ Blackpoll Warbler*	Ca-t	___ Baird's Sparrow	R-L-w	___ Evening Grosbeak	U-l,p
___ Violet-green Swallow	C-t,su	C-t,su	___ Sage Thrasher	U-l,w	___ Cerulean Warbler*	X	___ Fox Sparrow	R-t,w	<b>OLD WORLD SPARROWS</b>	
___ N Rough-winged	C-t,U-su,Ca-w	U-t	___ Brown Thrasher#	Ca-t,w	___ Black-and-White Warbler#		___ Song Sparrow	C-p	___ House Sparrow	C-p
___ Bank Swallow	U-t	C-t,su	___ Bendire's Thrasher	F-p	___ American Redstart	R-t,Ca-su,w	___ Lincoln's Sparrow	C-t,w	<b>OTHER SPECIES</b>	
___ Cliff Swallow	X	X	___ Curve-billed Thrasher	C-p	___ Prothonotary Warbler#	Ca-t	___ Swamp Sparrow#	R-t,w		
___ Barn Swallow	C-t,su	C-t,su	___ Crissal Thrasher	C-p	___ Worm-eating Warbler#	Ca-t,X-su,w	___ White-throated Sparrow	R-t,w		
<b>CHICKADEES &amp; TITMICE</b>			___ LeConte's Thrasher	R-L?	___ Blue Mockingbird*	X	___ White-crowned Sparrow	C-t,w		
___ Mountain Chickadee	C-p	C-p	___ Blue Mockingbird*	X	___ Ovenbird#	Ca-t,X-su,w	___ Golden-crowned Sparrow#	Ca-t,w		
___ Mexican Chickadee	F-L-p	F-L-p	<b>STARLINGS</b>	C-p	___ Northern Waterthrush	Ca-t,X-w	___ Dark-eyed Junco	C-t,w		
___ Bridled Titmouse	C-p	C-p	___ European Starling	C-p	___ Louisiana Waterthrush#	Ca-f,w	___ Yellow-eyed Junco	C-p		
___ Juniper Titmouse	U-L-p	U-L-p	<b>WAGTAILS &amp; PIPITS</b>	X	___ Kentucky Warbler#	Ca-t	___ McCown's Longspur	U-L-w		
<b>VERDINS &amp; BUSHTITS</b>			___ Red-throated Pipit*	C-t,w	___ Connecticut Warbler*	X	___ Lapland Longspur*	Ca-t,w		
___ Verdin	C-p	C-p	___ American Pipit	R-L-w	___ Mourning Warbler*	X	___ Chestnut-collared Longspur	C-t,w		
___ Bushiti	C-p	C-p	___ Sprague's Pipit	U-t,w	___ MacGillivray's Warbler	C-t,R-L-su	<b>CARDINALS, GROSBEAKS &amp; ALLIES</b>	C-p		
<b>WAXWINGS</b>			___ Bohemian Waxwing*	X	___ Common Yellowthroat	Ca-t,su,U-w	___ Northern Cardinal	C-p		
___ Red-breasted Nuthatch	U-p	C-p	___ Cedar Waxwing	U-t,w	___ Hooded Warbler#	Ca-t,su	___ Pyrrhuloxia	C-p		
___ White-breasted Nuthatch	C-p	C-p	<b>SILKY FLYCATCHERS</b>	C-p	___ Wilson's Warbler	C-t,Ca-w	___ Yellow Grosbeak*	Ca-su		
___ Pygmy Nuthatch	C-p	F-p	___ Phainopepla	C-p	___ Canada Warbler*	X	___ Rose-breasted Grosbeak#	R-t,Ca-su,w		
<b>WRENS</b>			<b>WOOD &amp; OLIVE WARBLERS</b>		___ Red-faced Warbler	C-su	___ Black-headed Grosbeak	C-su,t		
___ Cactus Wren	C-p	C-p	___ Olive Warbler	C-su,R-w	___ Painted Redstart	C-su,R-w	___ Blue Grosbeak	C-su,Ca-w		
___ Rock Wren	C-p	C-p	___ Blue-winged Warbler*	Ca-t,X-w	___ Slate-throated Redstart*	X	___ Lazuli Bunting	C-t,R-w		
___ Canyon Wren	C-p	C-p	___ Golden-winged Warbler*	Ca-t,X-w	___ Fan-tailed Warbler*	Ca-sp,X-f	___ Indigo Bunting	U-L-su,U-t		
___ Carolina Wren*	X	X	___ Tennessee Warbler#	R-t	___ Rufous-capped Warbler*	Ca?	___ Varied Bunting	F-L-su		
___ Bewick's Wren	C-p	C-p			___ Yellow-breasted Chat	C-su	___ Painted Bunting#	R-t		
							___ Dickcissel#	R-t		

VIROES

___ White-eyed Vireo*	R-t,w	Ca-t,su	___ House Wren	U-su,C-w	___ Orange-crowned	C-t,U-w,R-L-su	___ Hepatic Tanager	F-su,Ca-w	___ Bobolink#	Ca-t
___ Bell's Vireo	X	C-su	___ Winter Wren#	R-w	___ Warbler	F-t,X-w	___ Summer Tanager	C-su,Ca-w	___ Red-winged Blackbird	F-s,C-w
___ (Black-capped Vireo)*	C-p	X	___ Marsh Wren	F-t,w	___ Nashville Warbler	F-t,su	___ Scarlet Tanager*	Ca-t	___ Eastern Meadowlark	C-p
___ Gray Vireo	C-p	R-L-su	<b>DIPPERS</b>	R-L-su,R-w	___ Virginia's Warbler	C-su	___ Western Tanager	C-t,su,X-w	___ Western Meadowlark	C-w,R-L-su
___ Yellow-throated Vireo*	R-t,w	Ca-t,su	___ American Dipper	U-p	___ Crescent-chested Warbler*	Ca-t,w	___ Flame-colored Tanager*	Ca-su	___ Yellow-headed Blackbird	C-w,R-su
___ Plumbeous Vireo	Ca-t,w	C-su,t,R-w	<b>KINGLETS &amp; GNATCATCHERS</b>	C-t,w,R-su	___ Lucy's Warbler	Ca-t,w	<b>EMBERIZINES</b>		___ Rusty Blackbird*	Ca-t,w
___ Cassin's Vireo	F-t,w	F-t,R-w	___ Ruby-crowned Kinglet	U-p	___ Tropical Parula*	X	___ Green-tailed Towhee	C-t,w	___ Brewer's Blackbird	C-t,w
___ (Blue-headed Vireo)*	X	X	___ Blue-gray Gnatcatcher	F-p	___ Yellow Warbler	C-t,su,X-w	___ Spotted Towhee	C-p	___ Common Grackle*	Ca-t,w
___ Hutton's Vireo	C-p	C-su,U-w	___ Black-tailed Gnatcatcher	C-p	___ Chestnut-sided Warbler#	Ca-t,w	___ Eastern Towhee*	X	___ Great-tailed Grackle	C-p
___ Warbling Vireo	C-t,su	C-t,su	___ Black-capped Gnatcatcher*	Ca-?	___ Magnolia Warbler*	Ca-t	___ Canyon Towhee	C-p	___ Bronzed Cowbird	F-s,R-L-w
___ Philadelphia Vireo*	U-p	Ca-f,X-sp	<b>THRUSHES</b>	X	___ Cape May Warbler*	Ca-t,w	___ Albert's Towhee	C-p	___ Brown-headed Cowbird	C-p
___ Red-eyed Vireo*	U-p	Ca-t	___ Northern Wheatear*	X	___ Black-throated Blue	Ca-t,X-w	___ Rufous-winged Sparrow	U-p	___ Black-vented Oriole*	X
___ Yellow-green Vireo*	C-p	Ca	___ Eastern Bluebird	U-L-p	___ Warbler#	Ca-t,X-w	___ Cassin's Sparrow	C-su,R-w	___ Orchard Oriole*	Ca-t,X-w
<b>JAYS, CROWS &amp; RAVENS</b>			___ Western Bluebird	F-w,U-p	___ Yellow-rumped Warbler	C-p	___ Botteri's Sparrow	F-L-su	___ Hooded Oriole	C-su,Ca-w
___ Steller's Jay	Ca-t,w	C-p	___ Mountain Bluebird	U-l,w	___ Audubon's form	R-t,w	___ Rufous-crowned Sparrow	F-p	___ Streak-backed Oriole*	Ca-w,X-p?
___ Blue Jay*	X	X	___ Townsend's Solitaire	U-w,t	___ Myrtle form		___ Five-striped Sparrow	R-L-p?	___ Baltimore Oriole*	Ca-sp
___ Western Scrub-Jay	C-p	U-p	___ Veery*	X	___ Black-throated Gray Warbler	C-su,t,R-w	___ Chipping Sparrow	C-t,w,U-L-su	___ Bullock's Oriole	C-su,X-w
___ Mexican Jay	C-p	C-p	___ Gray-cheeked Thrush*	H	___ Black-throated Green Warbler*		___ Clay-colored Sparrow#	R-t,w	___ Scott's Oriole	C-su,Ca-w
___ Pinyon Jay	Ca-w	C-p	___ Swainson's Thrush	U-t	___ Townsend's Warbler	Ca-t	___ Brewer's Sparrow	C-t,w	<b>CARDUELINE FINCHES</b>	
___ Clark's Nutcracker	R-L-w	Ca-t	___ Hermit Thrush	C-p	___ Hermit Warbler	C-t,w	___ Field Sparrow*	X	___ Pine Grosbeak*	X
___ American Crow	C-p	C-p	___ Wood Thrush*	Ca-t	___ Blackburnian Warbler*	Ca-t	___ Black-chinned Sparrow	U-L-p	___ Purple Finch*	Ca-t,w
___ Chihuahuan Raven	C-p	C-p	___ Rufous-backed	Ca-w,X-su	___ Yellow-throated Warbler*	Ca-t,X-w,su	___ Vesper Sparrow	C-t,w	___ Cassin's Finch	C-p
___ Common Raven	C-p	C-p	___ Robin#	Ca-w,X-su	___ Grace's Warbler	C-su	___ Lark Sparrow	C-p	___ House Finch	C-p
<b>LARKS</b>			___ American Robin	Ca-w,X-su	___ Prairie Warbler*	X	___ Black-throated Sparrow	C-p	___ Red Crossbill	U-l,p
___ Horned Lark	C-p	C-p	___ Varied Thrush#	Ca-f,w	___ Pine Warbler*	Ca-w,X-t	___ Sage Sparrow	C-L-w	___ Pine Siskin	F-l,t,w,R-su
<b>SWALLOWS</b>			___ Aztec Thrush*	Ca-su,f,X-w,sp	___ Palm Warbler#	Ca-t,X-w	___ Savannah Sparrow	C-t,w	___ Lesser Goldfinch	C-p
___ Purple Martin	C-su	C-t	<b>MOCKINGBIRDS, THRASHERS &amp; ALLIES</b>		___ Prairie Warbler*	Ca-t,X-w	___ Grasshopper Sparrow	C-p	___ Lawrence's Goldfinch	U-l,t,w,X-su
___ Tree Swallow	C-t	C-t,su	___ Gray Catbird#	Ca-w,t	___ Bay-breasted Warbler*	Ca-t	___ Baird's Sparrow	R-L-w	___ American Goldfinch	U-t,w
___ Violet-green Swallow	C-t,su	C-t,su	___ Northern Mockingbird	C-p	___ Blackpoll Warbler*	Ca-t	___ Fox Sparrow	R-t,w	___ Evening Grosbeak	U-l,p
___ N Rough-winged	C-t,U-su,Ca-w	U-t	___ Sage Thrasher	U-l,w	___ Cerulean Warbler*	X	___ Song Sparrow	C-p	___ House Sparrow	C-p
___ Bank Swallow	U-t	C-t,su	___ Brown Thrasher#	Ca-t,w	___ Black-and-White Warbler#		___ Lincoln's Sparrow	C-t,w	<b>OTHER SPECIES</b>	
___ Cliff Swallow	X	X	___ Bendire's Thrasher	F-p	___ American Redstart	R-t,Ca-su,w	___ Swamp Sparrow#	R-t,w		
___ Barn Swallow	C-t,su	C-t,su	___ Curve-billed Thrasher	C-p	___ Prothonotary Warbler#	Ca-t	___ White-throated Sparrow	R-t,w		
<b>CHICKADEES &amp; TITMICE</b>			___ LeConte's Thrasher	R-L?	___ Worm-eating Warbler#	Ca-t,X-su,w	___ White-crowned Sparrow	Ca-t,w		
___ Mountain Chickadee	C-p	C-p	___ Blue Mockingbird*	X	___ Ovenbird#	Ca-t,X-su,w	___ Golden-crowned Sparrow#	Ca-t,w		
___ Mexican Chickadee	F-L-p	F-L-p	<b>STARLINGS</b>	C-p	___ Northern Waterthrush	Ca-t,X-w	___ Dark-eyed Junco	C-t,w		
___ Bridled Titmouse	C-p	C-p	___ European Starling	C-p	___ Louisiana Waterthrush#	Ca-f,w	___ Yellow-eyed Junco	C-p		
___ Juniper Titmouse	U-L-p	U-L-p	<b>WAGTAILS &amp; PIPITS</b>	X	___ Kentucky Warbler#	Ca-t	___ McCown's Longspur	U-L-w		
<b>VERDINS &amp; BUSHTITS</b>			___ Red-throated Pipit*	C-t,w	___ Connecticut Warbler*	X	___ Lapland Longspur*	Ca-t,w		
___ Verdin	C-p	C-p	___ American Pipit	R-L-w	___ Mourning Warbler*	X	___ Chestnut-collared Longspur	C-t,w		
___ Bushiti	C-p	C-p	___ Sprague's Pipit	U-t,w	___ MacGillivray's Warbler	C-t,R-L-su	<b>CARDINALS, GROSBEAKS &amp; ALLIES</b>	C-p		
<b>WAXWINGS</b>			___ Bohemian Waxwing*	X	___ Common Yellowthroat	Ca-t,su,U-w	___ Northern Cardinal	C-p		
___ Red-breasted Nuthatch	U-p	C-p	___ Cedar Waxwing	U-t,w	___ Hooded Warbler#	Ca-t,su	___ Pyrrhuloxia	C-p		
___ White-breasted Nuthatch	C-p	C-p	<b>SILKY FLYCATCHERS</b>	C-p	___ Wilson's Warbler	C-t,Ca-w	___ Yellow Grosbeak*	Ca-su		
___ Pygmy Nuthatch	C-p	F-p	___ Phainopepla	C-p	___ Canada Warbler*	X	___ Rose-breasted Grosbeak#	R-t,Ca-su,w		
<b>WRENS</b>			<b>WOOD &amp; OLIVE WARBLERS</b>		___ Red-faced Warbler	C-su	___ Black-headed Grosbeak	C-su,t		
___ Cactus Wren	C-p	C-p	___ Olive Warbler	C-su,R-w	___ Painted Redstart	C-su,R-w	___ Blue Grosbeak	C-su,Ca-w		
___ Rock Wren	C-p	C-p	___ Blue-winged Warbler*	Ca-t,X-w	___ Slate-throated Redstart*	X	___ Lazuli Bunting	C-t,R-w		
___ Canyon Wren	C-p	C-p	___ Golden-winged Warbler*	Ca-t,X-w	___ Fan-tailed Warbler*	Ca-sp,X-f	___ Indigo Bunting	U-L-su,U-t		
___ Carolina Wren*	X	X	___ Tennessee Warbler#	R-t	___ Rufous-capped Warbler*	Ca?	___ Varied Bunting	F-L-su		
___ Bewick's Wren	C-p	C-p			___ Yellow-breasted Chat	C-su	___ Painted Bunting#	R-t		
							___ Dickcissel#	R-t		

TANAGERS

___ Hepatic Tanager	F-su,Ca-w	___ Bobolink#	Ca-t
___ Summer Tanager	C-su,Ca-w	___ Red-winged Blackbird	F-s,C-w
___ Scarlet Tanager*	Ca-t	___ Eastern Meadowlark	C-p
___ Western Tanager	C-t,su,X-w	___ Western Meadowlark	C-w,R-L-su
___ Flame-colored Tanager*	Ca-su	___ Yellow-headed Blackbird	C-w,R-su
<b>EMBERIZINES</b>		___ Rusty Blackbird*	Ca-t,w
___ Green-tailed Towhee	C-t,w	___ Brewer's Blackbird	C-t,w
___ Spotted Towhee	C-p	___ Common Grackle*	Ca-t,w
___ Eastern Towhee*	X	___ Great-tailed Grackle	C-p
___ Canyon Towhee	C-p	___ Bronzed Cowbird	F-s,R-L-w
___ Albert's Towhee	C-p	___ Brown-headed Cowbird	C-p
___ Rufous-winged Sparrow	U-p	___ Black-vented Oriole*	X
___ Cassin's Sparrow	C-su,R-w	___ Orchard Oriole*	Ca-t,X-w
___ Botteri's Sparrow	F-L-su	___ Hooded Oriole	C-su,Ca-w
___ Rufous-crowned Sparrow	F-p	___ Streak-backed Oriole*	Ca-w,X-p?
___ Five-striped Sparrow	R-L-p?	___ Baltimore Oriole*	Ca-sp
___ Chipping Sparrow	C-t,w,U-L-su	___ Bullock's Oriole	C-su,X-w
___ Clay-colored Sparrow#	R-t,w	___ Scott's Oriole	C-su,Ca-w
___ Brewer's Sparrow	C-t,w	<b>CARDUELINE FINCHES</b>	
___ Field Sparrow*	X	___ Pine Grosbeak*	X
___ Black-chinned Sparrow	U-L-p	___ Purple Finch*	Ca-t,w
___ Vesper Sparrow	C-t,w	___ Cassin's Finch	C-p
___ Lark Sparrow	C-p	___ House Finch	C-p
___ Black-throated Sparrow	C-p	___ Red Crossbill	U-l,p
___ Sage Sparrow	C-L-w	___ Pine Siskin	F-l,t,w,R-su
___ Lark Bunting	C-t,w	___ Lesser Goldfinch	C-p
___ Savannah Sparrow	C-t,w	___ Lawrence's Goldfinch	U-l,t,w,X-su
___ Grasshopper Sparrow	C-p	___ American Goldfinch	U-t,w
___ Baird's Sparrow	R-L-w	___ Evening Grosbeak	U-l,p
___ Fox Sparrow	R-t,w	<b>OLD WORLD SPARROWS</b>	
___ Song Sparrow	C-p	___ House Sparrow	C-p
___ Lincoln's Sparrow	C-t,w	<b>OTHER SPECIES</b>	
___ Swamp Sparrow#	R-t,w		
___ White-throated Sparrow	R-t,w		
___ Harris's Sparrow#	Ca-t,w		
___ White-crowned Sparrow	C-t,w		
___ Golden-crowned Sparrow#	Ca-t,w		
___ Dark-eyed Junco	C-t,w		
___ Yellow-eyed Junco	C-p		
___ McCown's Longspur	U-L-w		
___ Lapland Longspur*	Ca-t,w		
___ Chestnut-collared Longspur	C-t,w		
<b>CARDINALS, GROSBEAKS &amp; ALLIES</b>			
___ Northern Cardinal	C-p		
___ Pyrrhuloxia	C-p		
___ Yellow Grosbeak*	Ca-su		
___ Rose-breasted Grosbeak#	R-t,Ca-su,w		
___ Black-headed Grosbeak	C-su,t		
___ Blue Grosbeak	C-su,Ca-w		
___ Lazuli Bunting	C-t,R-w		
___ Indigo Bunting	U-L-su,U-t		
___ Varied Bunting	F-L-su		
___ Painted Bunting#	R-t		
___ Dickcissel#	R-t		

ICTERINES

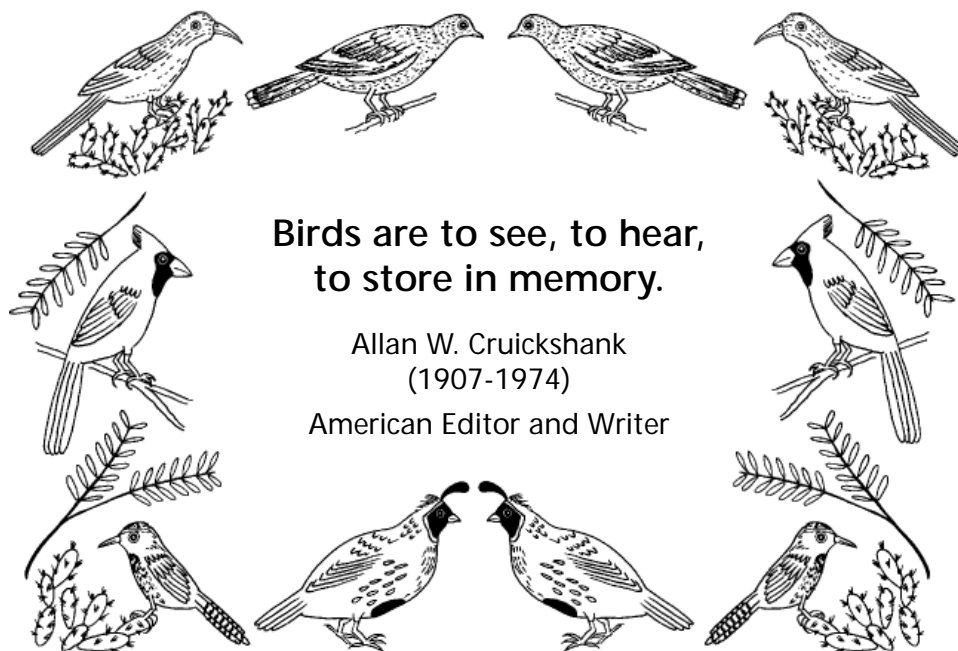
___ Bobolink#	Ca-t
___ Red-winged Blackbird	F-s,C-w
___ Eastern Meadowlark	C-p
___ Western Meadowlark	C-w,R-L-su
___ Yellow-headed Blackbird	C-w,R-su
___ Rusty Blackbird*	Ca-t,w
___ Brewer's Blackbird	C-t,w
___ Common Grackle*	Ca-t,w
___ Great-tailed Grackle	C-p
___ Bronzed Cowbird	F-s,R-L-w
___ Brown-headed Cowbird	C-p
___ Black-vented Oriole*	X
___ Orchard Oriole*	Ca-t,X-w
___ Hooded Oriole	C-su,Ca-w
___ Streak-backed Oriole*	Ca-w,X-p?
___ Baltimore Oriole*	Ca-sp
___ Bullock's Oriole	C



## Section Five ~ A Mini-Field Guide to Urban Birds Common to Southern Arizona

This mini-field guide may be reproduced for your classroom use. If you make two-sided copies, copy the pages just as they are presented here. Then cut along the mid-line, arrange the pages in numerical order, staple and—presto! You have a bird book.

The artwork on pages 7, 16, 21, 22, and 23 is by Doris Evans. All other art is by Kim Duffek and originally published in *Tucson Bird Watching Guide* through a cooperative effort between the Arizona Game and Fish Department and The Tucson Audubon Society and funded through the Arizona Game and Fish Department's Heritage Grant-In-Aid Program.

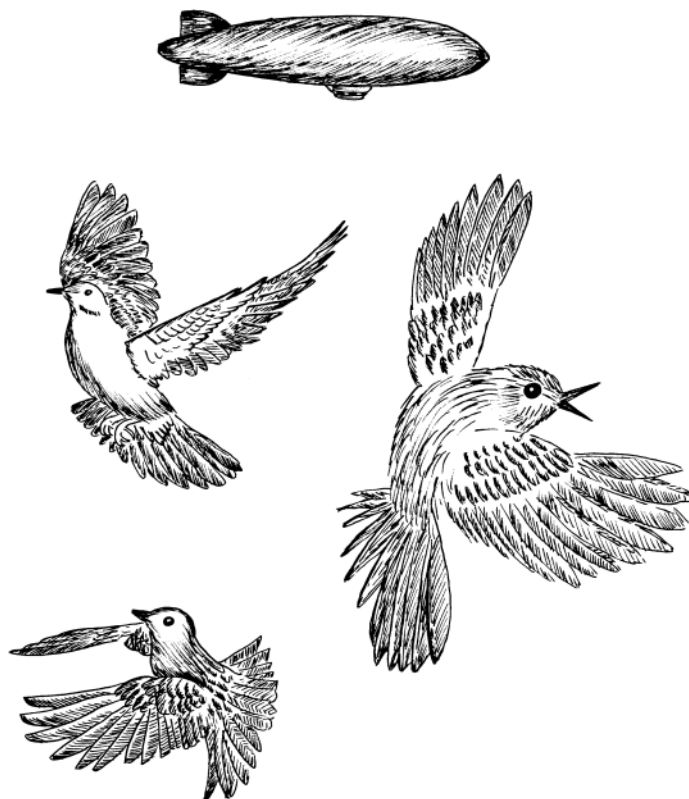


## One Big Hawk

One weekend afternoon I was quietly reading when the backyard birds who had been calmly feeding and resting suddenly “exploded” into the air. Wings flapped wildly and a few birds thudded against the windows in their frantic attempt to escape something.

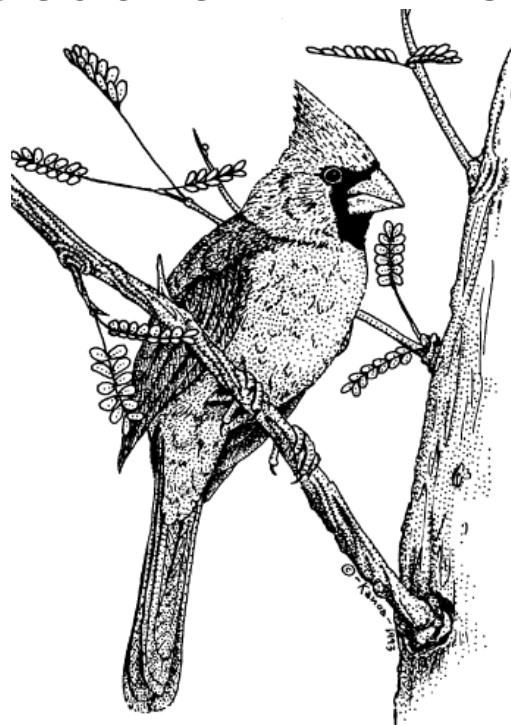
I jumped up and ran outside to see what was happening. Surely a large hawk must have landed nearby to cause such a flurry of activity. I looked up and there it was—not a hawk, but the Snoopy blimp drifting overhead. The big shape looming above signaled “danger” to the birds. Not a bird was to be seen.

The flying beagle was soon out of sight. The threat was gone and all was safe. In moments the birds were back to their usual activities of eating, drinking, and walking around the yard, appearing no worse for their recent fright.

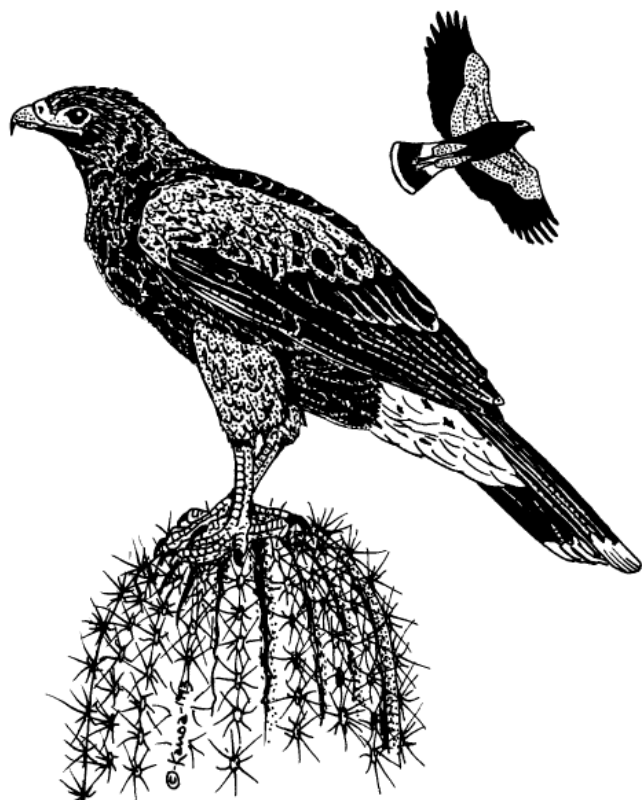


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# Southern Arizona



## Birding Guide



### Harris's Hawk — *Parabuteo unicinctus*

**Description:** 28 in. Dark rich brown with bright chestnut shoulder patches, wing linings, and thighs. Black tail has white base and white band at end. White rump.

**Voice:** Loud, rasping *khkhhaaaaa*.

**Habitat:** Mostly in open, dry country and in trees along rivers and washes. Common within urban Tucson perching and nesting in large trees.

**Diet:** Rodents, lizards, and small birds.

**Behavior:** Unusual for hawks, these birds are social and hunt in groups, cooperating to chase prey into open.

**Nest:** A shallow, bulky platform of sticks in mesquite, palo verde, yucca, or arm of saguaro.

**Migration:** Year-round resident.

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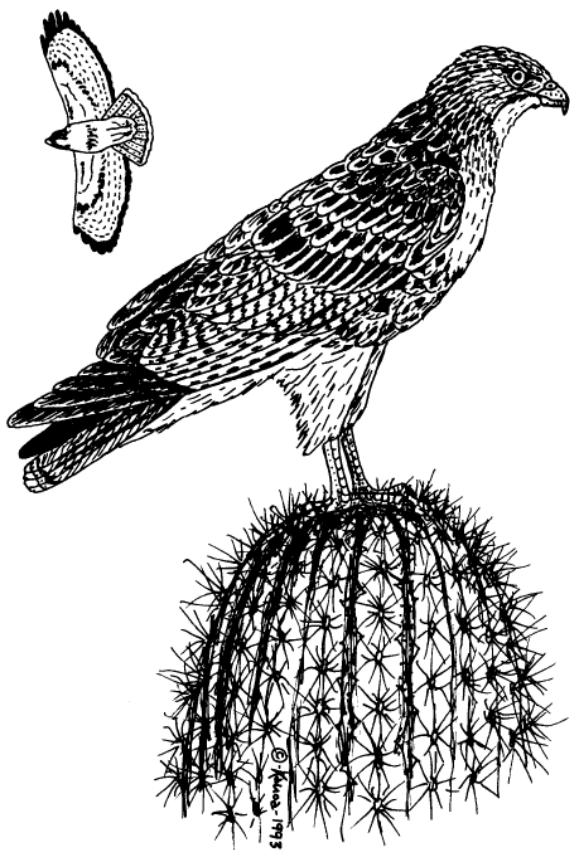
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Note: The length of the bird is the distance from the bill to the tip of the tail.  
Habitat, migration, and other notes refer to birds that inhabit Southern Arizona.



### Red-Tailed Hawk -- *Buteo jamaicensis*

**Description:** 22 in. Red tail above, light below with red showing through on overhead flight. Leading edge of wing is dark. Markings vary; in southwest underparts are light, pale mottling on back. Broad, rounded wings and broad tail.

**Voice:** Loud, harsh descending *keeyr* in flight or perching.

**Habitat:** Common in open country, grasslands, and desert.

**Diet:** Small mammals such as mice, rabbits, and squirrels. Also feeds on insects, reptiles—especially snakes, and birds.

**Behavior:** Soars on air currents and seldom flaps. Perches on trees, saguaros, and utility poles looking for prey.

**Nest:** Bulky stick nest on arm of saguaro, in tree or on utility pole. May reuse nest year after year.

**Migration:** Year-round resident.



### Great Horned Owl—*Bubo virginianus*

**Description:** 22 in. Large owl with “ear” tufts. Large head. Horizontal bars on belly, white throat.

**Voice:** Five or six deep hoots, ***HOO-hoo-hoo-HOO-HOOO***.

**Habitat:** Found in all habitats throughout North America.

**Diet:** Varied, including rodents, rabbits, skunks, birds, frogs, insects, scorpions, lizards, and small birds.

**Behavior:** Hunts at dusk and at night. Swoops down from high perch to capture prey. Good hearing and vision.

**Nest:** Nests in tall trees, cliff ledges, and on saguaro arms. Often uses old nest of hawks, eagles, or other large birds.

**Migration:** Year around resident.



### Inca Dove—*Columbina inca*

**Description:** 7 in. Scaly pattern all over, especially on the belly. Long, white-edged tail. In flight shows rusty wings. A small, slim bird.

**Voice:** ***Cooo-hoo-coo-hoo*** which sounds like it's saying, “no hope”.

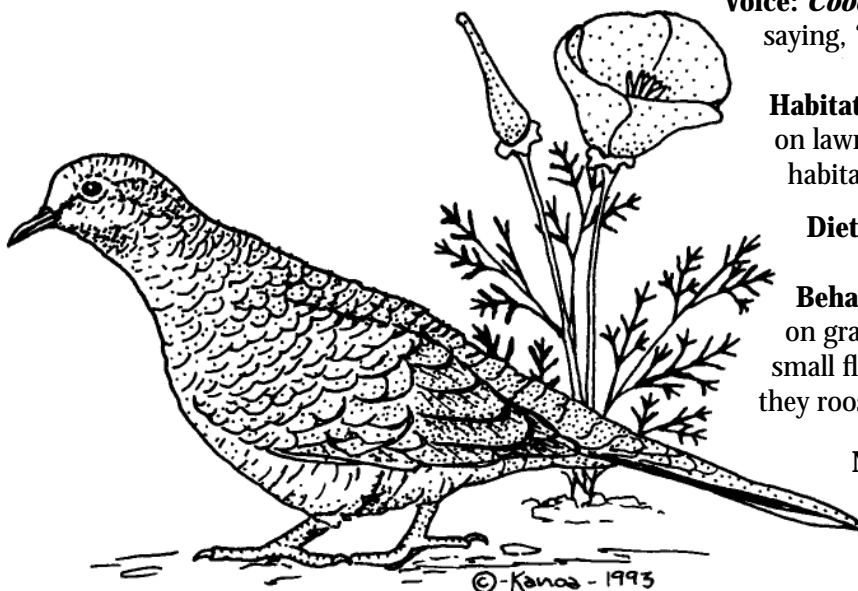
**Habitat:** Found mainly in urban habitats. Common on lawns and in parks. Seldom seen in natural habitats away from humans.

**Diet:** Mostly seeds, some fruits.

**Behavior:** Feeds as it walks on bare ground or on grass. Wings rattle on take off. Live in pairs or small flocks. Often two or more huddle together as they roost.

**Nest:** A small platform of twigs in trees, shrubs, or on building ledges.

**Migration:** Year around resident.



### Turkey Vulture—*Cathartes aura*



**Description:** 30 in. Underside of wings are light gray in back and dark in front. Featherless red head gives the appearance of a small head for the large body. Light bill. Wings are held in a shallow V. May rock from side to side as it soars.

**Voice:** Produces a hissing sound when frightened.

**Habitat:** Dry, open country, woods, farmland, deserts.

**Diet:** Carrion of recently dead animals and human refuse.

**Behavior:** Soars on warm air currents and seldom beats its wings. Feeds on dead animals. Many may roost at night in tall trees or cliffs. Finds carrion by odor (one of the few birds with a sense of smell) or watches other scavengers descending on food.

**Nest:** Cliffs, crevices, tree stumps or on the ground. Eggs are laid on debris or on flat bottom of nest site.

**Migration:** Migrates to Mexico in mid-October and returns in early March.

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### Mourning Dove—*Zenaida macroura*

**Description:** 12 in. Overall brownish color. Black spots on the upper wings, pinkish on breast. Slim, long tail tapers to a point. White spots along the edges of the tail.

**Voice:** A sad-sounding *coo-woo-WOOO-woo-woo* (thus the name “mourning”).

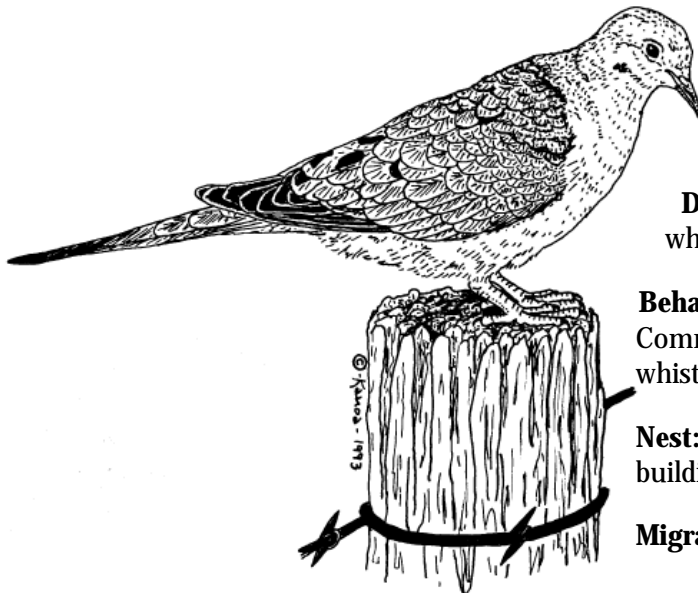
**Habitat:** Open areas such as farms, urban areas, grasslands, deserts, yards.

**Diet:** Mostly seeds. Fills crop with seeds and digests them while resting.

**Behavior:** Feeds mostly on the ground, foraging for seeds. Common on the ground beneath bird feeders. Wings produce a whistle as the bird takes flight. Often seen perched on wires.

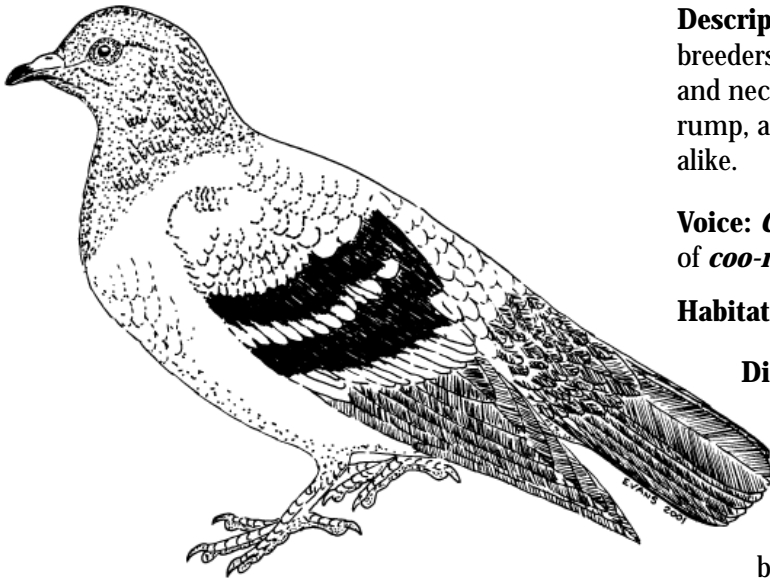
**Nest:** Flimsy platform of twigs in trees, shrubs, cholla cactus, building ledges, or hanging flower pots.

**Migration:** Year around resident.



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### Rock Dove—*Columba livia*



**Description:** 13 in. Colors variable due to the results of breeders. The common, wild form has a dark gray head and neck, pale gray body, black bars on wing, white rump, and black band at the of the tail. Male and female alike.

**Voice:** *Coo cuk cuk cuk coooo* and soft, gurgling series of *coo-roo-coo*.

**Habitat:** Cities and farms.

**Diet:** Mostly seeds, but also eats bread crumbs and many other foods offered by humans.

**Behavior:** Feeds as it walks on the ground.

**Nest:** A platform of twigs and grass on buildings ledges such as window ledges, under bridges, in parking garages, and in barns.

**Migration:** Year around resident.



### Northern Flicker—*Colaptes auratus*

**Description:**—12 in. Brown barred back, spotted underparts, black crescent on the chest. In flight yellow wing linings and a white rump can be seen. The male has a red “mustache”, the female does not.

**Voice:** Calls include a loud *klee-yer* and a loud rapid *wik-wik-wik*.

**Habitat:** Any area with trees including woodlands, desert, farms, and urban areas.

**Diet:** Mainly ants plus other insects, fruit, seeds, and nuts.

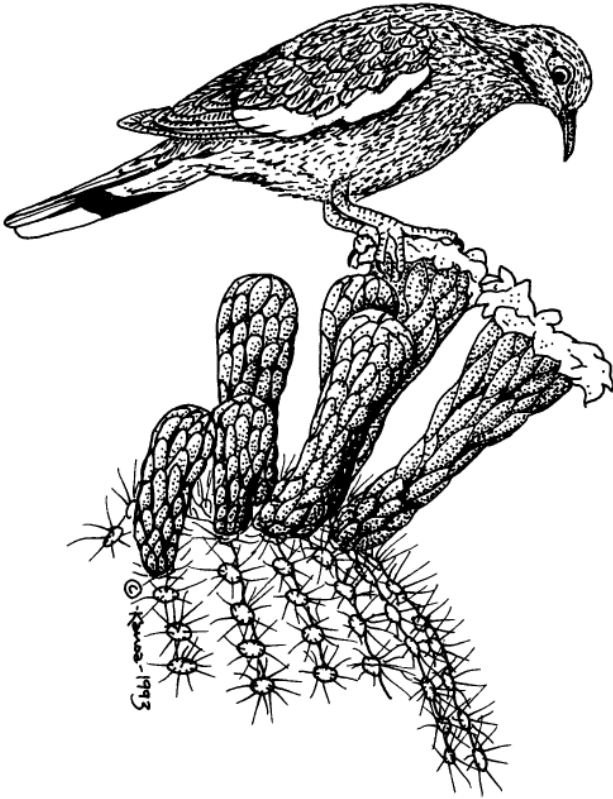
**Behavior:** Often feeds on the ground, moving in awkward hops. Also feeds along tree trunks and branches.

**Nest:** Cavity is chisled into a saguaro or tree.

**Migration:** Year around resident.



### White-winged Dove—*Zenaida asiatica*



**Description:** 11 in. Gray with large white wing patches and broad white corners on the tail. Tail is rounded. Bulkier than the Mourning Dove. Male and female alike.

**Voice:** A rich cooing that sounds like “who cooks for you?”

**Habitat:** Deserts, farms, urban areas.

**Diet:** Seeds, berries, cactus fruits and cactus flower nectar (an important pollinator of saguaro flowers).

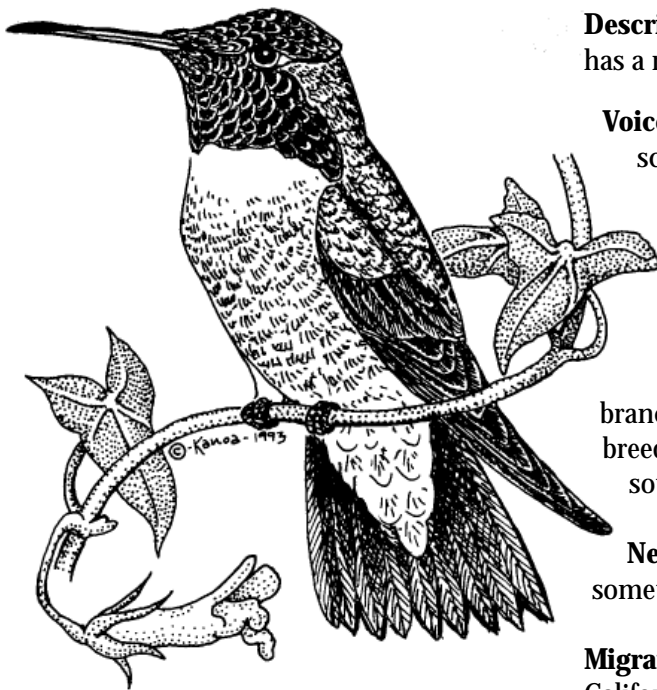
**Behavior:** Feeds on the ground, in trees, on tops of saguaros when they are in flower and fruit.

**Nest:** Flimsy platform of twigs in trees, shrubs, cholla cactus, and on arms of saguaros.

**Migration:** In the Tucson area from April to September. Most migrate into Mexico in winter, but a few may remain in the area.



### Anna's Hummingbird—*Calypte anna*



**Description:** 4 in. Male has a rose red head and throat. Female has a red spot or red flecks on the throat.

**Voice:** Chirps as it moves among flowers. Song is squeaky and scraping. Male has a buzzy song.

**Habitat:** Brushy desert, urban gardens and parks.

**Diet:** Flower nectar, sugar water from feeders, tree sap, insects, and spiders.

**Behavior:** Chases other hummers from feeders. Sits on branch preening. Showers under sprinklers or fountains. At breeding time males dive from high and make a loud popping sound at the bottom of the arc.

**Nest:** Tiny cup of plant fibers and spider webs on branch and sometimes on human structures.

**Migration:** Regular winter visitor. Arizona birds move to California after spring nesting and return in late summer.





### Lesser Nighthawk—*Chordeiles acutipennis*

**Description:** 9 in. White wing bar. Mottled brown resembling tree bark. Long pointed wings. Male has a white throat and white tail band. Females have a buffy wing bar and throat and no tail band.

**Voice:** A rapid mechanical sounding or toad-like trill and a low **chuck-chuck**. Heard mainly at breeding time.

**Habitat:** Desert, dry grassland, brushy country.

**Diet:** Insects such as beetles, moths, grasshoppers, flies, and winged ants.

**Behavior:** Active at dawn and dusk (crepuscular). Flies low as it scoops insects into wide mouth. Bat-like maneuverable, fluttery flight. Flies around bright lights catching insects. During day rests on the ground or lengthwise on a low branch.

**Nest:** No nest. Lays eggs on bare ground.

**Migration:** Fly south in fall and return in early spring.

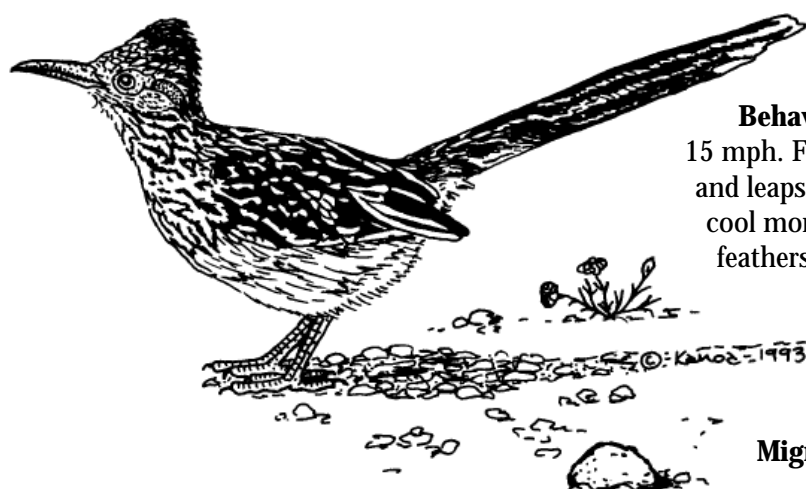
❖11❖

### Greater Roadrunner—*Geococcyx californianus*

**Description:** 22 in. Brown streaked, bare blue and orange skin behind eyes. Long tail with white spots underneath. Crest can be raised and lowered. Long, heavy bill. Male and female identical.

**Voice:** **Coo-coo coo-coo** descending in pitch. Loud cawing from a high perch.

**Habitat:** Deserts and open brushy country.



**Diet:** Insects, spiders, scorpions, lizards, snakes, small birds, rodents, cactus fruit.

**Behavior:** Walks and runs on ground. Can run 15 mph. Flies for very short distances. Rapid dashes and leaps to catch prey. Clatters bill. Warms itself on cool mornings by turning back to sun and erecting feathers exposing black skin to the sun's rays.

**Nest:** Platform of large thorny sticks within a bush, tree, cholla cactus, or on arm of saguaro.

**Migration:** Year around resident.

❖13❖

### Gambel's Quail—*Callipepla gambelii*



**Description:** 10 in. Male has black face, red-brown head, gray back, white belly with a black spot. Female is grayish brown and lacks head and face pattern. Both have topknot of black, forward curved feathers and white stripes on chestnut sides

**Voice:** Variety of clucks, **woot-woot-woot**, and a loud **chi-ca-go**. In breeding season male calls a loud **WAAOW**.

**Habitat:** Open, shrubby desert and mesquite thickets, especially near water sources, urban yards with seed feeders.

**Diet:** Mainly seeds, also leaves, berries, and buds.

**Behavior:** Feed in flocks except during spring breeding when they pair off. At night covey roosts in bushes and on low tree branches.

**Nest:** A shallow depression on the ground, may be lined with plant material, and concealed under bushes.

**Migration:** Year around resident.

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### Gila Woodpecker—*Melanerpes uropygialis*



**Description:** 9 in. Black and white bars on back, wings, and tail. Head and underparts soft brown. Male has a round red spot on top of head. Long, straight, chisel-like bill. Stiff tail feathers prop against vertical perch. Short legs. Two toes forward, two toes backward.

**Voice:** Loud, harsh **yip-yip-yip**, a **churrr**.

**Habitat:** Desert near saguaros, along rivers near cottonwoods, urban areas.

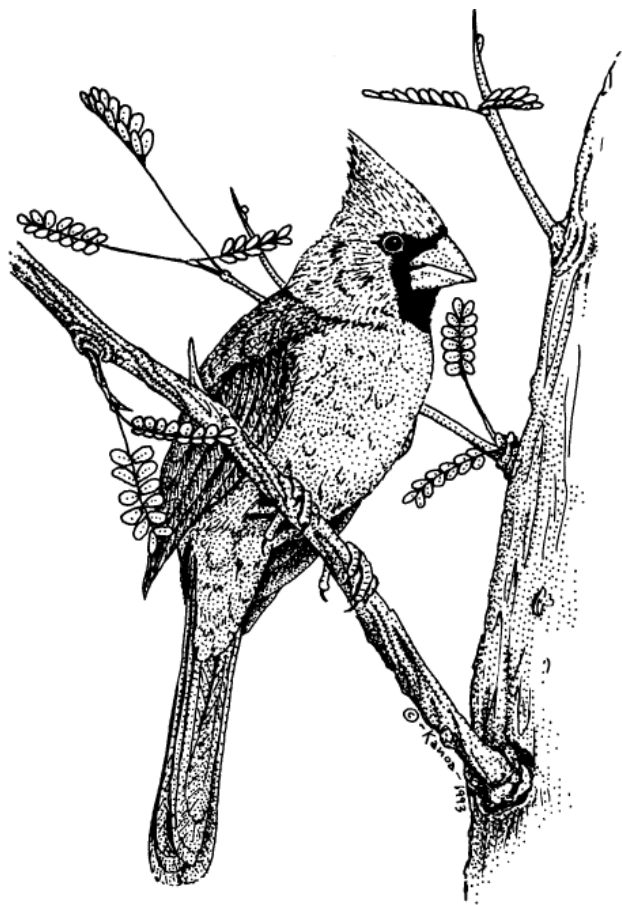
**Diet:** Insects, cactus fruit, flower nectar, seeds, lizards, eggs, sugar water from hummingbird feeders.

**Behavior:** Feeds along tree trunks and branches, on cactus, and on the ground.

**Nest:** Cavity excavated in a saguaro or mesquite, cottonwood, or palm tree. No nest material is brought in.

**Migration:** Year around resident.

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### Northern Cardinal—*Cardinalis cardinalis*

**Description:** 8 in. The male is bright red with a black face. The female is light brown with tinges of red on wings, tail, and crest. Both have a red bill.

**Voice:** Call: A loud *tchip*. Song: varied, often a loud, clear *chew-chew-chew* or *birdy-birdy-birdy*.

**Habitat:** Urban gardens, areas of mesquite groves or other thickets which provide nesting habitat.

**Diet:** Insects, fruit, seeds, and flowers. Eats sunflower seeds, cantaloupe seeds at feeders.

**Behavior:** Perches in trees and shrubs, but does much of its feeding on the ground where it hops along foraging for food.

**Nest:** Cup-shaped, made of twigs, stems, and leaves, high and hidden within tree branches.

**Migration:** Year around resident.

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### House Finch—*Carpodacus mexicanus*

**Description:** 5 in. Male has a bright red crown, breast, rump, eyebrow, and forehead, a brown cap. Female is brown streaked front and back, and plain brown face. Both have a streaked breast. Conical bill.

**Voice:** Call: Musical chirps and a whistled *wheet*. Song: Cheery, high pitched warbling with a loud, clear, *wheeer*.

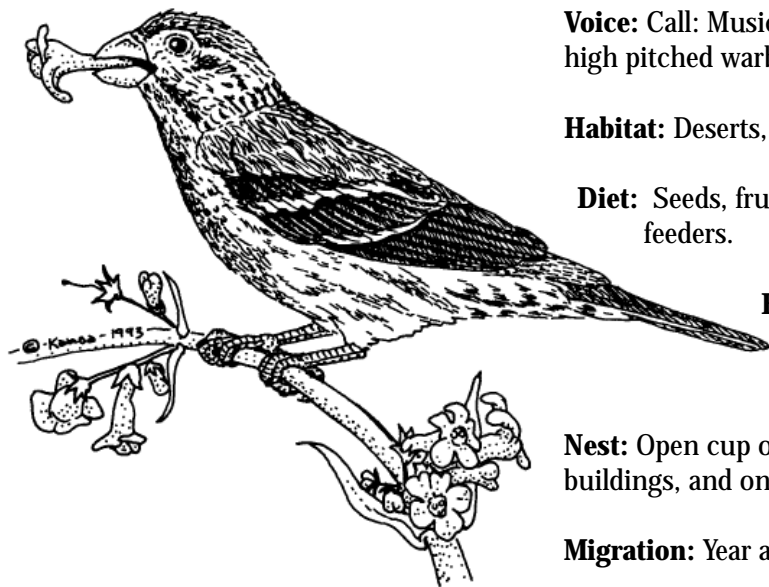
**Habitat:** Deserts, farms, urban yards and parks.

**Diet:** Seeds, fruit, buds, some insects. Comes to backyard bird feeders.

**Behavior:** Feeds on the ground, in weedy growth, in trees and shrubs. Usually in flocks, except in breeding season when they pair off.

**Nest:** Open cup of grass, twigs, and debris in natural growth, in buildings, and on old nests of other birds.

**Migration:** Year around resident.



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**Brown-headed Cowbird—*Molothrus ater***



**Description:** 7 in. Male is shiny black-green with a brown head. Female is gray brown above, pale below with a light throat. Short, heavy bill.

**Voice:** Call is a high, whistling *wee* and two lower *ti-ti* notes plus rattles and whistles. Song is a bubbly *glug-glug-glug* and high, thin notes.

**Habitat:** Farms, fields, prairie, desert, and open country.

**Diet:** Mostly seeds, some insects and other arthropods.

**Behavior:** Feeds while walking on the ground. Tail is lifted up.

**Nest:** None. Lays eggs in nests of other birds. Eggs and young cared for by host bird species.

**Migration:** Year around resident.

❖16❖

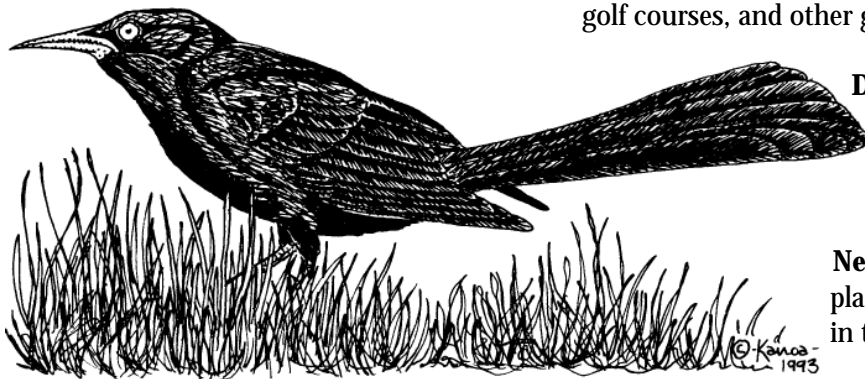
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**Great-tailed Grackle—*Quiscalus mexicanus***

**Description:** Male 18 in. Iridescent black with purple sheen. Female 14 in. brownish breast. Both have a keel-shaped tail and bright yellow eyes.

**Voice:** Varied, including cracks, whistles, squeaks, squawks, a harsh *chek-chek-chek*, a high *kee-kee-kee*.

**Habitat:** Groves of trees, farms, wetlands. Common in urban parks, golf courses, and other grassy areas.



**Diet:** Insects, lizards, toads, bird eggs, young birds, fruit, and seeds.

**Behavior:** Noisy, not shy, in groups.

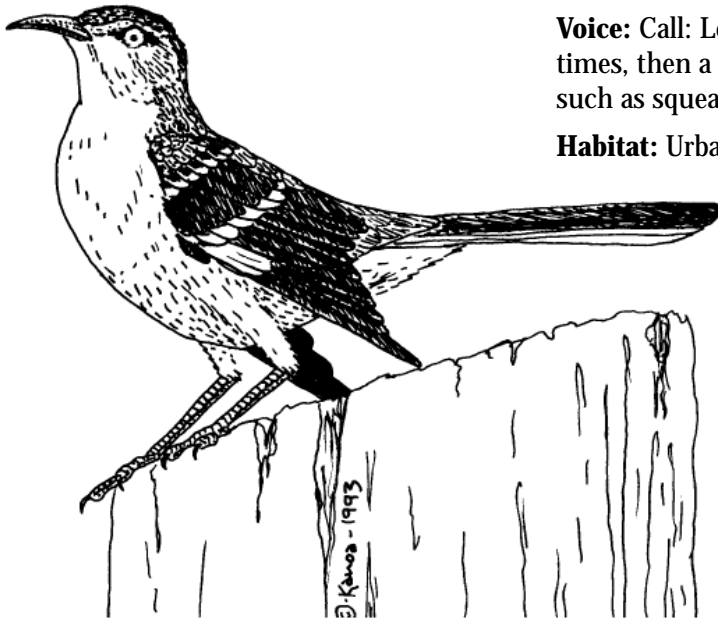
**Nest:** Cup-shaped, bulky, made of twigs, other plant material, mud. Many nests close together in trees.

**Migration:** Year around resident.

❖18❖

### Northern Mockingbird—*Mimus polyglottos*

**Description:** 10 in. Pale gray, darker wings, with white wing patches very visible in flight. White outer tail feathers. Slim. Long tail. Male and female alike.



**Voice:** Call: Loud *tchak* and *see*. Song: Repeats a phrase many times, then a different phrase. Mimics other birds and other sounds such as squeaky doors, bells, cats, and dogs. May sing at night.

**Habitat:** Urban yards and parks, farms, brushy areas, deserts.

**Diet:** Insects, other arthropods, berries.

**Behavior:** Defends nests by attacking cats, larger birds, and humans. Catches insects while walking or running or flies down from perch. May leap into air from a high perch and flutter back down while singing.

**Nest:** Twig foundation with an open cup of grass, leaves, and other plant material.

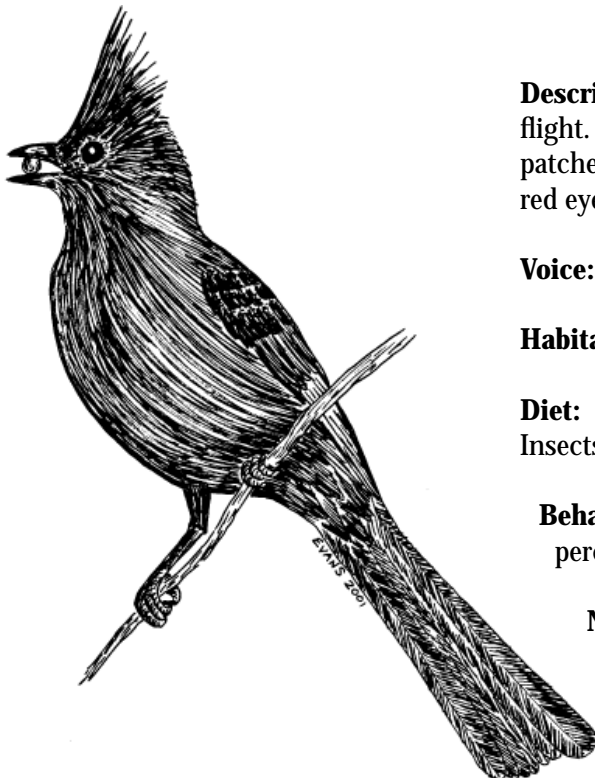
**Migration:** Found year around, but may be different individuals. Some birds leave in winter, others leave in summer.

❖19❖

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### Phainopepla—*Phainopepla nitens*

**Description:** 8 in. Male is glossy black. White wing patches show in flight. Female is gray with light edges to wing feathers. Light wing patches show in flight. Both are slim, with long tail, spiky crest, and red eyes.



**Voice:** Call: Soft, rising *wurp*. Song: Soft, gurgly warble.

**Habitat:** Desert scrub, mesquites, oaks, where mistletoe is present.

**Diet:** Berries of mistletoe, buckthorn, juniper and non-native trees. Insects.

**Behavior:** Guards mistletoe from other birds. Feeds from branch perch. Catches insects in midair. Fluttery flight.

**Nest:** Small, shallow cup of twigs and other plant material bound with spider webs. Often within a clump of mistletoe or in a branch fork.

**Migration:** Nests in desert areas in spring moves to other areas later. Moves to food sources.

❖21❖

### Hooded Oriole—*Icterus cucullatus*

**Description:** 7 in. Male has orange head, black bib, back, wings and tail. Two white wing bars. Female is olive green above, dull yellow below. Both have long, slightly curved bill.

**Voice:** Call is a rising *wheet* and a chatter. Song is a musical jumble of warbles, whistles, trills, *chut-chut-chut*, and *whew-whew*.

**Habitat:** Urban areas with ornamental flowering plants, trees along streams, open woods, canyons.

**Diet:** Insects, fruit, nectar, sugar water from hummingbird feeders.

**Behavior:** Pierces base of tubular flower for nectar—does not pollinate. Feeds on insects and fruit in trees.

**Nest:** Hanging pouch of woven plant fibers sewed to twigs or on underside of palm or yucca leaves.

**Migration:** Most arrive in March, depart in May, some stay year around.



❖20❖

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### Pyrhuloxia—*Cardinalis sinuatus*

**Description:** 8 in. Male is gray with red face, crest, breast, wings, and tail. Female is buffy with red tinges. Both have a gray back, a yellow, thick, pale, parrot-like bill.

**Voice:** Call is a metallic *tchip*. Song is a whistled *what-cheer-what-cheer* and dry, thin notes.

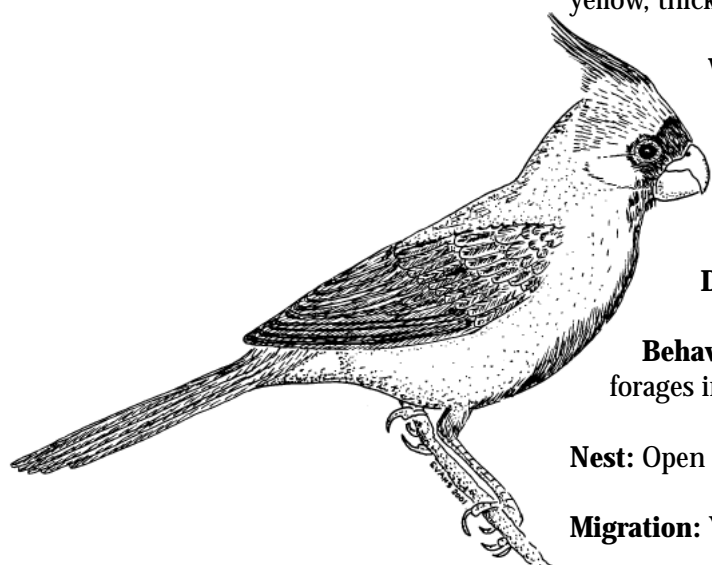
**Habitat:** Deserts, thorny brush, mesquites, desert washes, urban areas.

**Diet:** Insects, seeds, berries, backyard seed feeders.

**Behavior:** Looks for food while hopping on ground. Also forages in bushes and trees.

**Nest:** Open cup of thorny twigs and grasses in shrub or low tree.

**Migration:** Year around resident.



❖22❖

### House (English) Sparrow—*Passer domesticus*

**Description:** 6 in. Male: gray crown, chestnut nape, black throat and bill, white cheeks. Female: streaked back, tan eye stripe. Both have unstreaked breast.

**Voice:** Variety of chirps and chatters.

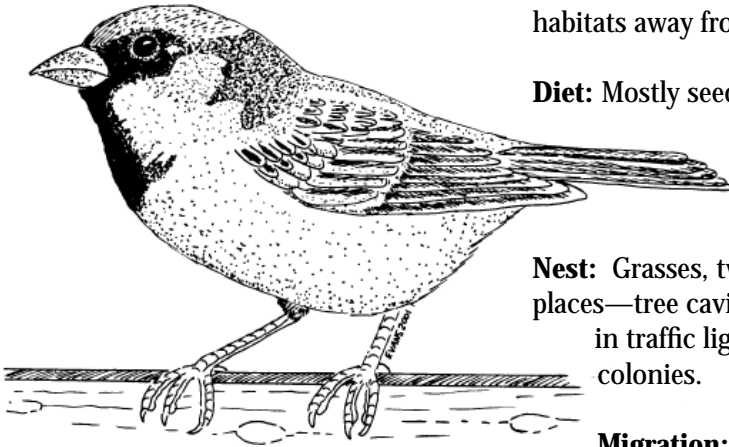
**Habitat:** Urban streets, yards, parks and farms. Not in natural habitats away from humans.

**Diet:** Mostly seeds, also insects, crumbs left by people. Common at bird feeders.

**Behavior:** Hops on ground as it looks for food.

**Nest:** Grasses, twigs, debris fill the nest cavity. Nest in enclosed places—tree cavity, holes in buildings, behind letters on store fronts, in traffic lights, in woodpecker holes in saguaros. Often nest in colonies.

**Migration:** Year around resident.



❖23❖

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### European Starling—*Sturnus vulgaris*

**Description:** 8 in. Black with purple and green gloss in spring and summer. In fall has white spots which fade in winter. Chunky, short tail, thin bill is yellow in spring, duller other times of year.

**Voice:** Call: Chatter, soft whistles. Song: wheezes, whistles, gurgles, sputters. Can imitate other birds.

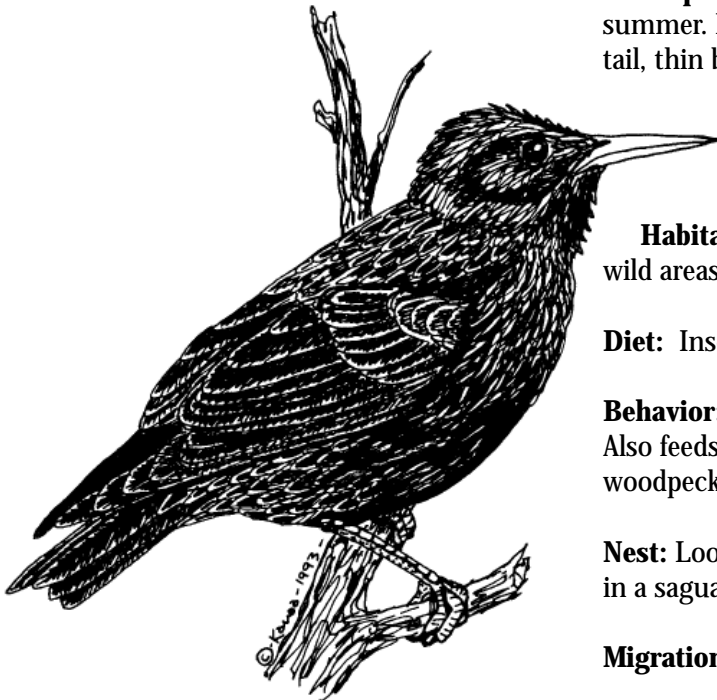
**Habitat:** Cities, farms, and any disturbed habitat. Not found in wild areas away from people.

**Diet:** Insects, berries, seeds. Common at bird feeders.

**Behavior:** Waddles along ground looking for food, usually in flocks. Also feeds on fruit in trees, and catches insects in air. May evict woodpeckers from their holes.

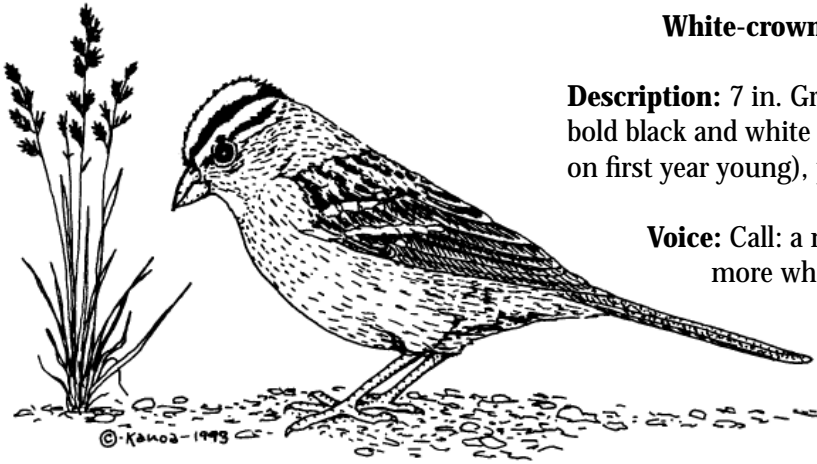
**Nest:** Loose mass of twigs, weeds, leaves within a woodpecker hole in a saguaro and holes in buildings.

**Migration:** Year around resident.



❖25❖

### White-crowned Sparrow—*Zonotrichia leucophrys*



**Description:** 7 in. Gray and brown streaked back, light gray front, bold black and white stripes on crown of adults (chestnut and gray on first year young), pink or yellow bill.

**Voice:** Call: a metallic *pink* and a soft *seet*. Song: one or more whistles followed by trills.

**Habitat:** Gardens, parks, and desert washes where there are brushy places.

**Diet:** Seeds, berries, and insects.

**Behavior:** Usually forages in flocks. Hops and runs on the ground. Feeds on ground and in low shrubs.

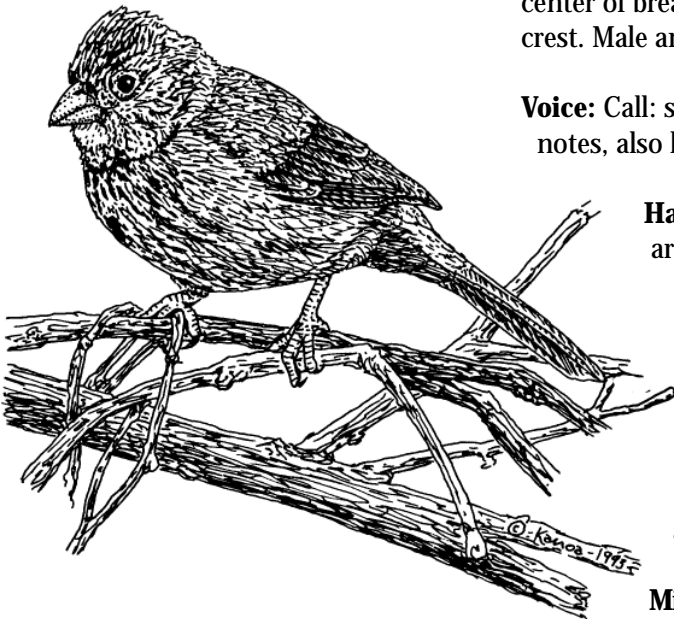
**Nest:** Cup nest of grass, twigs, other plant material. Nest in the high mountains of northern and central Arizona and north to Canada and Alaska.

**Migration:** Winters in southern Arizona. Migrates to higher northern ground for breeding.

❖24❖

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### Canyon Towhee—*Pipilo fuscus*



**Description:** 8 in. Grayish brown with rust undertail, dark spot in center of breast, rufous cap which is sometimes raised in a small crest. Male and female alike.

**Voice:** Call: shrill *chee yep*. Song: call note followed by slurred notes, also lisping and squealing sounds.

**Habitat:** Southwest foothills and canyons, grassy, weedy areas with cover. In urban areas where habitat is suitable.

**Diet:** Mostly seeds in winter, more insects in summer.

**Behavior:** Hop, feed on ground, often feed under things such as bushes and cars. Live in pairs all year.

**Nest:** Deep cup of woven twigs and grasses. Placed on a branch against the tree trunk, hidden in dense foliage.

**Migration:** Year around resident.

❖26❖

**Curve-billed Thrasher—*Toxostoma curvirostre***

**Description:** 10 in. Gray-brown back, light mottled breast, orange eyes. Long tail, long down-curved bill. Male and female alike.

**Voice:** Call: Loud, human-like whistle *whit WHEET*. Song: Pretty trilling warbling songs. Can mimic other birds.

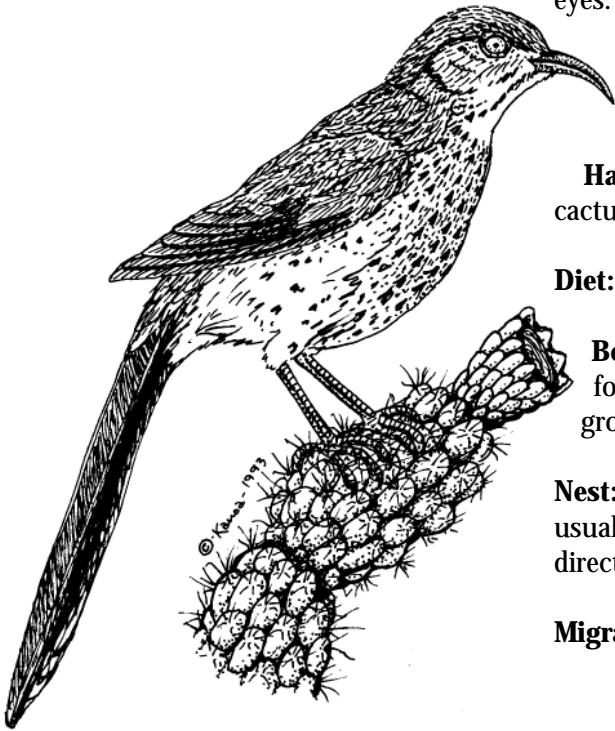
**Habitat:** Desert, urban yards and parks, especially near cholla cactus.

**Diet:** Insects and other invertebrates, fruit, nectar, seeds.

**Behavior:** Digs and probes under rocks and plants looking for food. Pairs stay together all year. Spend much of the time on the ground running then stopping to look for food.

**Nest:** Bulky bowl-shaped nest of loosely woven thorny twigs, usually in a cholla cactus. The adult birds break off the spines directly above the nest.

**Migration:** Year around resident.



❖27❖

**Yellow-rumped Warbler--*Dendroica coronata***

**Description:** 5 in. Yellow patches on rump, crown, and sides of chest, yellow throat, white spots in tail. Male is blue-gray above and has a black breast patch. Female has same pattern but duller.

**Voice:** Call: loud *tchek tchip*. Song: series of thin warbling notes of *seet-seet-seet-seet-trrrrr*, rising or falling at the end.

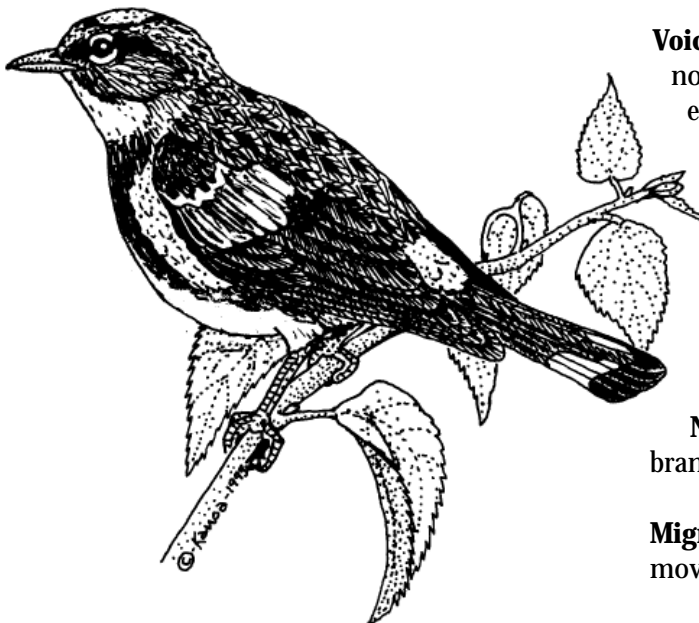
**Habitat:** Forest, woods, brushy areas, urban gardens.

**Diet:** Insects, berries.

**Behavior:** Feeds among leaves, branches, tree trunk, and on ground. Will fly out to catch insects.

**Nest:** Open cup of plant fibers and twigs on horizontal branch or on branch against the trunk.

**Migration:** Some spend winter at lower elevations, then move to higher ground in summer.



❖29❖

**Verdin—*Auriparus flaviceps***



**Description:** 4 in. Mustard-yellow head and throat, chestnut shoulder patches, long tail. Male and female alike.

**Voice:** Call: rapid *chip-chip-chip*. Song: whistled *tsee-tsee-tsee* and *chee-lip*.

**Habitat:** Brushy desert, common in acacia and palo verde in desert washes, and in urban areas with trees.

**Diet:** Mostly insects, but also fruit, seeds, flower nectar, and sugar water from hummingbird feeders.

**Behavior:** Flits among bushes and trees looking for insects. May hang upside down from branches. In pairs or solitary.

**Nest:** Softball-size, oval-shaped nest of densely woven thorny twigs with opening near the bottom. Located near end of a branch or in the crotch of cholla cactus branches. Well-made nest lasts a few years.

**Migration:** Year around resident.

❖28❖

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**Cactus Wren—*Campylorhynchus brunneicapillus***



**Description:** 8 in. Reddish-brown cap, broad white streak above each eye, brown and white streaked back. Spotted breast, white spots on tail. Male and female alike.

**Voice:** Noisy, one pitched *cha-cha-cha-cha*.

**Habitat:** Open desert, urban yards and parks.

**Diet:** Insects spiders, lizards, seeds, cactus fruit, bird feeder items.

**Behavior:** Runs along ground in short spurts. Lifts stones looking for insects. Picks insects from car grills in parking lots. Commonly perches in cholla cactus and ocotillo.

**Nest:** Football size and shape, opening at narrow upper end facing outward. Made of grasses and debris. In cholla cactus, crotch of saguaro arm, or within tree branches.

**Migration:** Year around resident.

❖30❖